# Western Industry

September 1955

First step in making paper takes place when a giant swing cut-off saw—which is 108 in, in diameter—cuts logs to a usable length.

... see page 30



THIS SSUE

Saving \$72 a day in one operation

Semi-automatic bulk handling

How small plants can use industrial engineers

Answers to solvent degreasing problems

### SEE RUST-OLEUM APPLIED DIRECTLY OVER RUSTED SURFACES!

### SEE PROOF OF PERFORMANCE! MAKE THIS TEST UNDER YOUR OWN CONDITIONS!

See Rust-Oleum 769 Damp-Proof Red Primer applied over a rusted surface after scraping and wire-brushing to remove rust scale and loose rust in the Rust-Oleum "rusted panel demonstration." Rust-Oleum's specially-processed fish oil vehicle penetrates rust to bare metal . . . saving time, money, and metal!

Beautify as you protect with colorful Rust-Oleum finish coatings. Specify Rust-Oleum for new construction, maintenance, and re-modeling. See nearest Rust-Oleum Industrial Distributor, or attach coupon to your business letterhead.



## RUST-OLEUM



ATTACH TO YOUR BUSINESS LETTERHEAD AND MAIL TO: Rust-Oleum Corporation, 2528 Oakton Street, Evanston, Illinois

Please Show Me the Rust-Oleum "Rusted Panel Demonstration."

See local classified telephone directory under

Rust Preventives or Paints for nearest Rust-Oleum Industrial Distributor.

Test Application of Rust-Oleum Over Rusted Metal Surfaces in My Plant.

Complete Literature with Color Chart.

### Contact Your Nearest Rust-Oleum Distributor Today!

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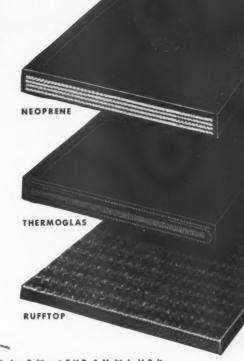
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### Thermoid Conveyor Belting cuts your handling costs

There's a Thermoid Conveyor Belt designed to lower your costs on every type of materials handling job. Each is best suited for the particular type of service recommended. Here are 3 selected from the complete Thermoid line:NEOPRENE—built especially for conditions where heat and oil are encountered;THERMOGLAS—designed for use where belt is exposed to temperatures of 275° to 350° F.; RUFFTOP—Thousands of irregular gripper points guide smooth surfaced articles up inclines to 35°.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life, less down time, lower handling costs. Your Thermoid Distributor carries a full line of Thermoid Conveyor Belting, Hose and Multi-V Belts to meet your most exacting requirements. He maintains complete stocks and can give you fast service. If you prefer, write direct.





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### NEW PUTNAM END MILL WITH 4-FLUTE BALL END IMPROVES THREE DIMENSIONAL PROFILING

The 4-flute ball end cuts cleaner and lasts longer. With little or no vibration this new Putnam End Mill gives smoother results, extra wear, more production. Like all 1200 sizes and types in the Putnam line, it meets your special requirements and does a better job. A factory trained specialist is available to work with you on your tooling or production problems.

The complete Putnam line is one of more than 100 brands of tools and industrial supplies distributed by The Garrett Supply Company. Call us and you'll find our service as good as our supplies — the best. Whatever you need, "Get it from Garrett!"

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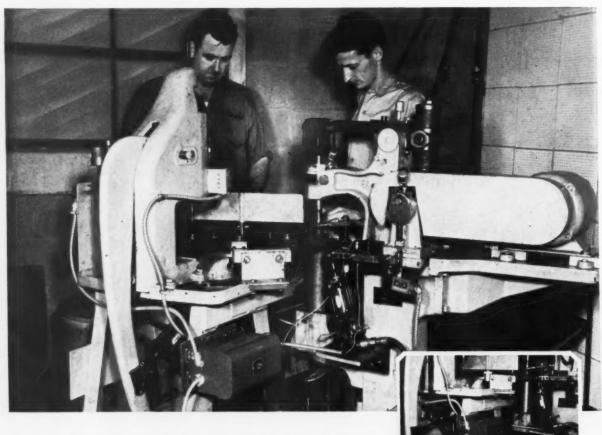


CORPORATION

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# IMAGINATION AND BELLOWS PNEUMATIC DEVICES INCREASE PRODUCTION OF A STANDARD "KICK" PRESS FROM 3 PARTS PER MINUTE TO 25 PARTS PER MINUTE

OPERATION: Staking cap and core assembly for shock mounts



INTERVIEW WITH MR. PLANT SUPER-INTENDENT OF FROM TAPE RECORDING TAKEN IN THEIR PLANT AT WATERTOWN, MASS.

- Q. Mr. Tell us about this machine.
- A. We attached a Bellows Air Motor to a standard kick press to replace the man's foot, added a Bellows Rotary Feed Table to feed the parts and stepped up production from approximately 3 pieces per minute to about 25. This one machine took the place of 5 kick presses. Once this machine was rigged up, we had no further use for the other four.
- Q. But there is a riveting machine as well as a kick press on the unit we are photographing, Mr.
- A. Recently we tied in a high speed riveter to the set-up in order to use the rotary feed table on two different operations. On this second operation, we are peening an aluminum rivet. When the riveter was operating manually a sharp operator could produce 220 to 225 parts per hour. This way we get about 1,080 per hour.

The ease with which Bellows Air Motors can be electrically interlocked and controlled simplifies greatly designing for air approximation.



Bellows Air Motors will operate in any position and are made in bore sizes, from 1" to 4½" in any stroke length, and in a range of mounting styles.

- Q. How does it happen that you have two somewhat unrelated operations on the same machine?
- A. There was such a fabulous increase in production in the staking operation that it wasn't necessary to keep the machine operating all the time. I got the idea that by tieing in the riveter to the same Bellows Rotary Feed Table we could do two operations on the same machine. I outlined my problem to your Bellows Field Engineer and he spent a couple of hours showing me what could be done and how it could be done with Bellows equipment. I took his advice and immediately purchased the equipment. We put it together here and are just tickled to death with the results.
- Q. Out in back awhile ago, you said something about the Bellows equipment arriving just in the nick of time.
- A. The equipment arrived just as we had a terrific demand for one type product — in fact, we had to produce something like 180,000 of these cap and core assemblies

- in two weeks. We worked overtime to get this machine working. We weren't too fussy about how it looked. I'm happy to say we produced the 180,000 parts in plenty of time to satisfy our customer.
- Q. In your mind, Mr. what is the outstanding feature about Bellows pneumatic equipment?
- A. I would say on all our machines that are now operated with Bellows equipment the fatigue factor has been definitely lessened. The people have but one thing to do that is load and unload the machine. The machine travels at a constant speed, they get themselves in tune. The machine goes through its work cycle, it doesn't hit too long, it doesn't hit too short. The cycle is controlled much better than it could be manually. Wherever we can put the skill of a man into a machine, we're one step farther towards our goal: everything perfectly controlled with a minimum of human effort.

## HOW YOU CAN USE BELLOWS "CONTROLLED-AIR-POWER" TO DEVELOP LOWER COST PRODUCTION FROM COUNTLESS STANDARD MACHINES

Bellows pneumatic devices are compact "packaged" power units that serve as auxiliary sources to move parts or tools to position, feed cutting tools through work, clamp and hold parts or perform virtually any push, pull, lift or turn motion. They can be electrically interlocked with each other for accurate safe sequencing. They can be quickly and easily installed on such standard machines as drill presses, milling machines, grinders, kick presses, riveters, etc., or can form the working heart of an almost unlimited number of low cost, tool-room-built special purpose machines.

### YOUR BELLOWS FIELD ENGINEER CAN SHOW YOU HOW — OR WRITE FOR FREE FOUR COLOR BOOKLET

There are more than 100 full time Bellows Field Engineers located in every major industrial area in the United States and Canada. You'll find them listed in the phone book under "The Bellows Co." (In Canada, under Bellows Pneumatic Devices of Canada, Ltd.) You'll enjoy talking to a Bellows Field Engineer. He has at his finger tips the accumulated experience of thousands of manufacturing plants who are finding in Bellows "Controlled-Air-Power" effective ways to lower production costs. Phone him today — or write direct to Dept. WI 955, The Bellows Co., Akron 9, Ohio, for a copy of "How to Lower Production Costs with Air."



1238-A



### Here's MASS-HANDLING of bulk

What you see above is a Dempster-Dumpster serving one of its detachable containers. Multiply this simple pick up, haul and dump operation by scores of steel containers built to meet your requirements for handling waste or salvable materials, raw and finished products, fluids including acids, combustibles, dusty materials, etc. You have, then, mass-handling of bulk materials with one truck and one man!

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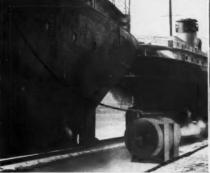
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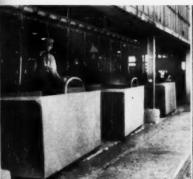
Tilt Type Container is handling filter dirt at a plant in Illinois. Note container is equipped with casters and placed under chute, through which the filter dirt passes directly from presses. As each container is filled, it is replaced with an empty one.

Three heavy duty Drop Bottom Type Containers, shown below, are loaded with cast iron fittings from conveyor at plant in Birmingham. Dempster-Dumpster picks up each container when loaded and hauls the finished products to shipping department. Tank Type Container is being filled with used oil from a ship. Time required to haul loaded container to reclaim station, drain and return for refilling—10 minutes. Time cycle of the former method using conventional barrels—60 minutes.

Here's another example of the many types of waste materials handled by this system. The Skip Type Container shown below is located under hydropulper at a paper plant. Picture was shot while container was being filled with rope waste sludge.

A loaded Apartment Type Container, equipped with roller bearing casters, is being rolled to outside of this plant building. Dempster-Dumpster will pick it up, haul to disposal area, dump the refuse and return empty container for refilling.

Waste materials are loaded into these Universal Containers at a food plant warehouse. Containers have lids in top, as well as a door in each end, which are opened to make deposits, then closed, sealing materials in container.







### materials with one truck...one man!

A FEW OF THE HUNDREDS of containers available are shown above in actual service. They are built in capacities up to 21 cu. yds.—several times the capacity of the average dump truck body. One Dempster-Dumpster, operated by only one man, the driver, serves scores of big detachable containers, one after another—handling materials of every description. It's like having one truck with scores of bodies!

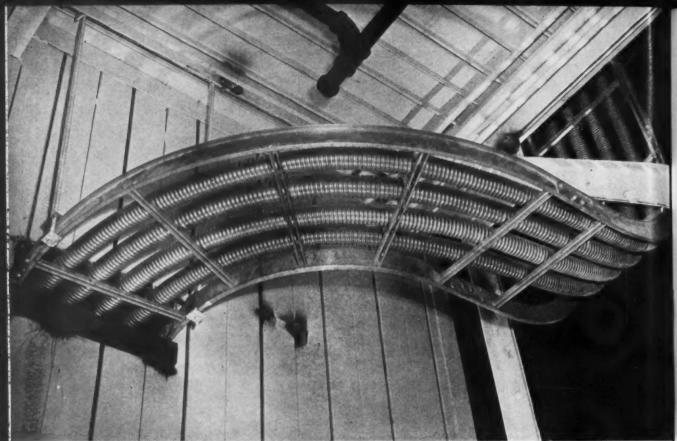
Records of performance in dozens of installations prove beyond question that savings are tremendous! The Dempster-Dumpster System cuts costs of equipment and operation. It is common knowledge that one Dempster-Dumpster will perform the work of several conventional trucks, reducing investment ac-

cordingly. This system eliminates standing idle time and re-handling of materials. Once placed in these containers, materials remain there until hauled to destination. Efficiency, sanitation and good plantkeeping are big advantages. Materials to be transferred or disposed of are constantly being placed in the containers as they accumulate. Containers for handling refuse are fire-proof, rat-proof and scavenger proof.

With no obligation on your part, our engineers will be glad to make a comprehensive fact-finding survey to determine the cost-cutting possibilities of this equipment in your plant. Write us for complete information today! Manufactured exclusively by Dempster Brothers, Inc.

### DEMPSTER BROTHERS 595 N. Knox, Knoxville, Tennessee

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ANACONDA INTERLOCKED-ARMOR Cable is installed on simple racks and eliminates the need for conduit. Installation work is finished often in half the time required for other cables.

Instead of installing cable plus conduit ...

# Cut installation time and cost with cable with its own inbuilt flexible conduit!

When you expand or relocate your power feeders, Anaconda Interlocked-Armor Cable puts you into *full* operation days—sometimes weeks—sooner.

Because it is made with its own tough yet flexible armor, Interlocked-Armor Cable is installed without conduit. Installation time and costs are slashed

It is laid quickly-indoors or outon light, easily installed racks. It is trained smoothly around corners, columns and other obstructions in *long*, uninterrupted runs. And this cable's metal tape armor affords high protection against damage.

Available in multiconductor construction in sizes No. 6 Awg to 750 Mcm-varnished-cambric insulation up to 15 kv-Underwriters' approval for 600 volts and 5000 volts. Also available with rubber or plastic types of

insulations.

Why not talk to the Man from Anaconda about modern, practical Interlocked Armor Cable today? Or, for information, write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

### **ANACONDA**

FASTEST WESTERN SERVICE — Anaconda's Western Distributors and expanded and modernized Orange, California mill which fabricates copper and aluminum wire and cable for every kind of application assure West fastest possible service on all needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle.

METALWORKING PLANT expands its power system with Anaconda Interlocked Armor Cable (1). Cable drops from ceiling (2) from transformer on floor above, and spreads out (3) carrying more power to local centers (4).











# "SKIL Drills Stay on the Job TWICE AS LONG!"

"In our business, grain and cement dust are hard on electric tools. Yet, with SKIL Model 75 drills, we have far less trouble than with any other brand.

"Our men like SKIL Drills better, too. They have extra power and they're easier to handle. One other big benefit is SKIL service. When we need it, the SKIL branch takes care of us in a hurry. We think they're the best drill by far . . . in every way."

### These Features Make SKIL Model 75 a Favorite!

- 55% more powerful, yet lighter in weight.
- Choice of 7 speeds (500 to 5,000 r.p.m.).
- Handy, safety-designed trigger lock for continuous operation—side location for easy use.
- All anti-friction bearings for longer life.
- Large inspection plate for routine maintenance.
- Comfortable "Contour-grip" handle.



### FREE!--

Send this coupon. Your SKIL Distributor will give you a no-obligation demonstration. See how you can increase performance with Model 75 SKIL Drill.

When you buy a drill be sure it's a SKIL.

. . . for more details, circle No. 6 on Reader Service Postcard
- . . . for more details, adv. on opposite page, circle No. 7 on Reader Service Postcard



Downtime and the labor cost of replacing worn-out tubing made of common materials can be a great deal more expensive than the extra first cost of long-lasting stainless.

The tube failure pictured is a dramatic reminder of the indeterminate, and usually shorter, service life of tubing which may bear a smaller price tag, but whose total cost can be measured only after

the ravages of time and corrosion have tested its durability.

For optimum strength, corrosion resistance and oxidation resistance, there's a stainless grade, size, heat treatment and finish best suited to your particular pressure and temperature requirements. Ask Mr. Tubes, your link to B&W, how to get more for your money with stainless. Or write for Bulletin TB-356. WI



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TUBULAR PRODUCTS DIVISION

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## NOW! FASTER DELIVERY

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OVERNIGHT DELIVERY to most areas of the most popular models and sizes of Nutting Floor Trucks, Casters and Wheels . . . maintenance, repair services and parts also available.

### CONTACT YOUR NEAREST NUTTING REPRESENTATIVE

Backed by the most complete line of floor trucks in America plus factory engineering services, these experienced sales engineers can quickly solve your handling problems.

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NUTTING TRUCK & CASTER COMPANY

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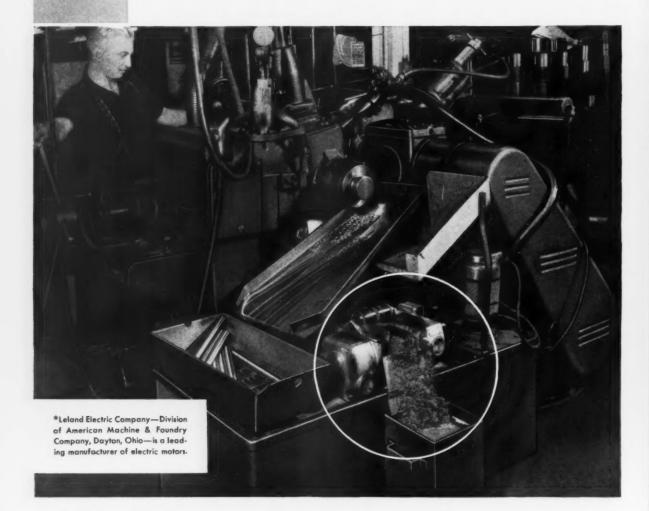
Faribault, Minnesota

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CRINGING MACRINE COCLANT CLARIFICATION

### HOUDAILLE MAGNETIC SEPARATORS

### save \$2230 annually for Leland Electric Company\*



• Coolant contamination is no longer a problem in Leland Electric's armature shaft grinding department.

Five Houdaille Magnetic Separators—mounted on grinder sumps—provide machines with a constant supply of clean coolant. Separator shown above removes 62 pounds of metallic chips and sludge daily.

Annual savings in coolant and maintenance costs total \$2230. Other benefits include longer wheel life, better product finish, more sanitary working conditions.

The Houdaille Magnetic Separator is designed for complete removal of ferrous metal chips and abrasives. Compact, lightweight, easy to install. Uses no floor space, needs no separate pump and motor. 10, 20, 40 GPM capacities. Write for Equipment Bulletin 601 and 4-page Leland case history.

A SUBSIDIARY OF HOUDAILLE-HERSHEY CORP

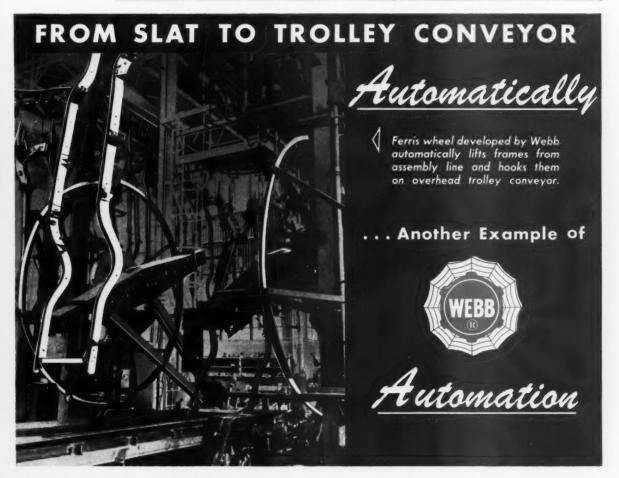
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CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION



Located in Philadelphia is one of the country's most modern plants for producing passenger car chassis frames. It is equipped with conveyor systems that automatically carry 3,000 of the large frames a day through various assembly operations, painting and shipping.

Slat conveyors are used in assembly and shipping departments while overhead trolley conveyors carry assembled frames through washing, painting and

At the end of the final assembly line, frames are

automatically picked off the slat conveyor by a unique two-arm Ferris wheel device (designed by Webb) and hooked on the overhead conveyor for washing and painting. Another automatic device, built by Webb, has three trunnion-mounted arms which pick frames off the overhead conveyor after painting and deposit them on the slat conveyor in shipping room.

For automatic handling of any size or type of material, Webb engineering experience and reputation is your best assurance of receiving the finest in conveyor automation.

### IERVIS B. WEBB CO. of

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Write to us on your company

letterhead and we will be happy to place your name on

the Webb mailing list to receive factual technical information on conveyor installa-

tions, case history reports,

and new product literature.

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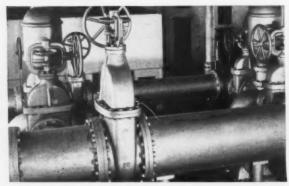


#### Courtesy Chicago Historical Society

### Chicago does it better now...with CRANE valves

From this questionable method that served early Chicago—to a current daily consumption of more than 1 billion gallons—that's the amazing story of water demand and supply growth in America to our national consumption of 175 billion gallons daily. And every drop flows through pipelines under control of valves.

If you could see the maze of piping that satisfies the people's and industry's thirst, you would find Crane a prominent name on the valves.



SAVINGS FOR TAXPAYERS SINCE 1903—Beaumont, Texas, City Water Works installed these Crane valves in 1903. They survived the Municipal Pumping Station's conversion from steam to diesel power, and they're still giving dependable, low-cost service. That's durability—the kind Crane quality adds to valves of brass, iron, steel and alloys.

Valves for waterworks—and for every flow control need—have been one of Crane Co.'s main products throughout a century of quality manufacturing. Quality first and foremost makes Crane valves traditionally the first choice of thrifty, value-minded specifiers and buyers.

Crane quality assures a longer life of peak efficiency with lower maintenance cost. That's why more Crane valves are used than any other make.



BIG AS A HOUSE OR SMALL AS YOUR HAND, Crane valves perform with equal dependability. Each design has a background of continuous development, precise manufacturing and thorough testing. There's extra value for valve buyers in every industry. Crane Co., General Offices, Chicago 5. Branches and Wholesalers in all areas.

### CRANE CO.

VALVES • FITTINGS • PIPE KITCHENS • PLUMBING • HEATING

CRANE'S FIRST CENTURY...1855-1955

THRIFTY

... for more details, circle No. 12 on Reader Service Postcard
WESTERN INDUSTRY — September 1955



# New Du Pont Safety Floor Wax

with slip-retardant LUDOX®

gives superior slip resistance plus long-lasting beauty

The anti-slip protection of new Du Pont Safety Floor Wax brings a new measure of safety to floors in schools, plants, hospitals, stores, restaurants and other public buildings. And it gives this vital extra security along with full gloss, washability and extra-long life!

A premium slip-retardant wax, Du Pont Safety Floor Wax gives long-lasting beauty to linoleum, asphalt tile, rubber tile, vinyl tile and any other resilient floor covering. It is waterresistant—dries to a satin gloss in 20 minutes, then buffs to a high shine. Can be damp-mopped and buffed again and again with no loss in anti-slip protection. Available in 1-gallon, 5gallon, 30-gallon, and 50-gallon containers.

You can get new Du Pont Safety Floor Wax through a Du Pont Floor Wax distributor in your area. For name of nearest source and information, write Du Pont Co., Specialties Sales, Wilmington 98, Del.





EVERY STIP is safer because Du Pont Safety Floor Wax is fortified with anti-slip "Ludox"—trans-parent particles of colloidal silica. Under pressure these tiny particles are pushed into softer wax globules. They absorb much of the foot's forward energy . . . give positive traction underfoot!

LIVING . . . THROUGH CHEMISTRY

. . . for more details, circle No. 13 on Reader Service Postcard

# American Blower Vertical Unit Heaters offer you

# Air-flow control with Equitemp Air Diffusers



Capacities: 58,400 to 560,000 BTU at 2 lbs. steam pressure, 60° entering air.

VERTICAL UNIT HEATERS

Adjustable Equitemp Air Diffuser lets you tailor heat flow to the job.



Equitemp Air diffusers are standard equipment on American Blower Venturafin Vertical Unit Heaters. Extremely versatile, this unique air diffuser lets you control heat distribution at all mounting heights by simple hand adjustment.

At low mounting heights, for example, the Equitemp Diffuser can be adjusted to eliminate the blast of heated air that so often bothers employees directly beneath. Yet, for high-ceiling mountings, diffuser vanes may be left in vertical position for maximum blow. Anemostat and vane-type diffusers also available.

Select low-cost, quiet-operating Venturafin Unit Heaters for your next job. For data, consult your nearest American Blower Branch Office. Do it, today!



For applications requiring heaters with horizontal blow, American Blower offers a wide selection. Capacities: 18,000 to 357,500 BTU at 2 lbs. steam pressure, 60° entering air.

### Equitemp Air Diffusers are adjustable for various mounting heights



High ceilings

Medium ceilings

Low ceilings

### Other American Blower Unit Heaters

American Blower's gas-fired unit heaters and de luxe cabinet heaters for commercial and industrial use are compact, efficient and easy to install. AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO Division of American Radiator & Standard Sanitary Corporation

AMERICAN



BLOWER

Serving bome and industry: American-Standard • American blower • Church Seats & Wall Tile Detroit Controls • Kewanee Boilers • Ross exchangers • Sunbeam air conditioners

# Standard Engineer's Report

Standard Roof Coatings Empire Construction Co., FIRM Sacramento Calif.

### Roof leaks stopped for first time by special coating

WHEN STANDARD ALUMINUM AS-BESTOS COATING was sprayed on these prepared-paper and corrugated iron roofs, it made them completely weatherproof for the first time in 15 years! From the first, roofs leaked in new places each winter, despite patching and repairing. After coating was applied no sign of a leak appeared despite a very heavy rainy season. 21 gallons to 100 square feet were used because of roofs' bad condition. 2 gallons per square were used on walls. On the corrugated metal roof, a light film of Standard Aluminum Asbestos Coating was first sprayed on after sweeping. Next, glass fabric was spread and brushed down smooth while coating was still wet. Then, a final coat was sprayed on.



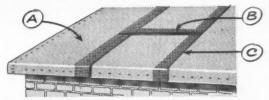


THIS PUMP AND COMPRESSOR were used by the appliers, Empire Construction Co., Sacramento, Calif., to handle the Standard Aluminum Asbestos Coating without thinning or heating. They used the complete line of Standard Roof Coatings to protect all types of roofs and walls. In years of use, they found them easy to apply and always of uniformly high quality.

FREE FOLDER tells you more about Standard Roof Coatings and how to use them. Write or ask for it

FOR EXPERT HELP On reconditioning roofs or other surfaces, on lubrication or fuel problems, call your Standard representative; or write 225 Bush St., San Francisco.

How Standard Roof Coatings weatherproof metal, prepared-paper, concrete, brick



- A. Form resilient "blanket" over entire surface...wide expansion and contraction range prevents cracking. Insulate and deaden sound. Aluminum types reflect sun—reduce interior temperatures as much as 10°F. in hot summer weather.
- B. Adhere firmly to all surfaces...remain pliable. Economical—cover well.
- C. Flow freely into seams, cracks, nail holes—form tight seal. May be sprayed, brushed, or applied with squeegee.

TRADEMARK "STANDARD" REG. U S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

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# EDITORIALS

### Whither automation?

ONE ANSWER to the above question was supplied by President Dean Wooldridge of Ramo-Wooldridge Corporation of Los Angeles (a split-off from Hughes) at the electronics and automation symposium staged by Stanford Research and National Industrial Conference Board in San Francisco last month.

He predicted a repetition of the history of military electronics, where unified teams of scientists, engineers, and procedures experts have learned to treat the entire complex of technical and non-technical matters in any project as a single integrated problem and turn up with a combination of equipment and procedures that best meet the needs of the situation, and have found assigning of over-all systems responsible for automation programs to purely operational, non-technical people a mistake.

Dean L. K. M. Boelter of UCLA engineering reported the inauguration of courses in systems engineering at his school.

President Paul B. Wishart of Minneapolis foresaw small companies protecting their future through purchasing standardized automatic equipment developed to meet the common denominator requirements of hundreds of thousands of small companies. A forward-looking automation program, in his opinion, can enable a company almost overnight to cause an upheaval in its competitive field, despite the fact that all its competitors are employing heavy sales artillery.

### More forthrightness

WE had occasion a few months back to commend Kennecott Copper Corp. for forthrightness in announcing its labor relations policy, making known its employee relations objectives, and bringing the various levels of supervision into the process of deciding what those objectives are

Now there is occasion to commend Kennecott again for doing what very few employers have had the courage and good judgment, coupled with restraint and fairness, to do. The August issue of Kennevadan, the company magazine for its Nevada Mines Division, carries an editorial explaining the company's position in regard to the strike then current, and pointing out in actual figures how its offer and its wage history compare with other typical large companies.

In the same issue a letter is published from "an average Kennecott employee," asking some searching questions about the situation in regard to the upkeep of company-owned housing. Along with it appears the company's frank reply, over the signature of the director of employee relations.

Kennecott has met the problem which almost all companies have evaded. It has not met it by preaching, by an upstage attitude, nor by meaningless words. It has met it by sober, quiet, and man-to-man reasoning. Whether this particular issue of *Kennevadan* will solve the immediate problem of the strike, we cannot say at this writing; editorials have to be written considerably ahead of the date on which a magazine goes into the mails. But as a long-range method of operating, it cannot fail to pay off.

### Ten years of the atom

"ATOMS for peace" were released at a prodigious rate at the recent Geneva conference on atomic energy. Along with them came the news that a town had actually been supplied with electric power from a nuclear source; in other words, the 1,200-population town of Arco, Ida., had been hitched for a few minutes to the reactor at the big Idaho Falls nuclear research center of the Atomic Energy Commission.

It caused only the mildest ripple of excitement, and to most people nuclear energy is still far, far off from daily life. But when you look back ten years, it requires no stretch of imagination to realize that a lot of things can happen between now and 1965.

In the September 1945 issue of WESTERN INDUSTRY, just ten years ago, and right after open publicity was given to the fact that we had a vast military atomic project on the upper Columbia River, the lead article was headed: "Atomic Project as a Factor in Western Industrialism. Hanford Engineer Works in Eastern Washington, most costly of all war facilities, must be considered for peace-time possibilities."

WESTERN INDUSTRY'S only answer at the time was that somehow and at some time this new form of material energy would be translated into constructive practical form. But a question asked in the article has only partially been answered, "Can the government control of the processes, which all connected with this unfoldment agree is necessary and inevitable, be geared to a private enterprise economy?"

# flow-mation\* A GREAT NEW IDEA IN MATERIALS HANDLING



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handling in the past decade.

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Operator drops finished piece into chute that leads to box below. It's as simple as that—but so was the safety pin.

One unit or a thousand . . . they'll save you handling dollars the moment you set them up. Get your copy of a specially prepared booklet on FLOW-MATION\* now. Simply write to your Powell representative or contact Powell direct.

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\*FLOW-MATION and FLOW-MATIC are trade names of the Powell Pressed Steel Co. —Product Patent Pending.

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### the POWELL PRESSED STEEL Co.

DEPT. 595 .

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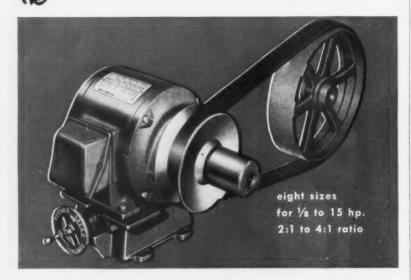
AIR MAC INC. OF OREGON 1435 S. E. Union Avenue Portland 14, Oregon Filmore 6524

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### **Vari-Speed Motor Pulley**

\*\* This simple, compact REEVES unit provides an economical way to widen machine range, and an efficient method of adjusting work flow to changing conditions. Speed variations are effected smoothly and instantly—without stopping the machine! Unit also available without motor. For bulletin complete with rating charts and dimensions, write Department 18-V545.

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The wide range of Reeves variable speed equipment is now supplemented by the line of Reliance drives. Now—more than ever—you can rely on your Reeves representative for the answer to any speed control problem.

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### **LETTERS**

Contributions to this column from our readers are welcome. Names will be withheld from publication if requested. Unsigned letters will be disregarded.

### Looking ahead

Editor, WESTERN INDUSTRY:

I have read, with a great deal of interest, the article in your July issue entitled "Can Small Plants Afford Industrial Engineers?"

I would appreciate it if you would send us ten copies of this article and you may consider this letter as your authority to bill us for the same.

Likewise, if they are available, I would appreciate receiving ten copies of the second article on this same subject which you intend to publish in your September issue.

MURRAY HOWARD
Partner
Stanley Foundries
Huntington Park, Calif.

### Needs two-gets two

Editor, WESTERN INDUSTRY:

We will appreciate receiving two sets each of tearsheets of the following articles:

April 1955: The use of LP gas on automotive equipment, fork trucks, and others.

May 1955: Steam traps—how to install.

W. VIERLING Maintenance Engineer Climax Molybdenum Co. Climax, Colo.

### **Sharpening yours?**

Editor, WESTERN INDUSTRY:

It would be greatly appreciated if you will please forward six reprints of the article "Sales Tools Are Like Sharp Shop Tools," appearing in the July issue.

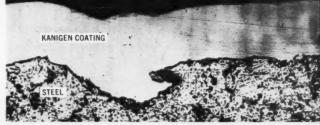
M. A. WIMP General Manager Speed-D-Burr Corp. Glendale, Calif.

#### Appreciation

Editor, WESTERN INDUSTRY:

I wish to express my appreciation to you for sending Western Industry. Your magazine is a tremendous aid in keeping up to date with the developments of industry in the West.

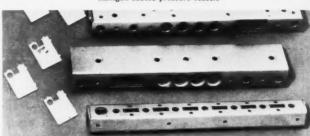
LAVERNE MORGAN Oakland Plant Manager Edward R. Bacon Co. Oakland



photomicrograph showing uniformity of Kanigen coating over steel (250X)



Kanigen-coated pressure vessels



Kanigen-coated aluminum electronic assembly ready for soldering

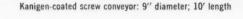


Could you use Kanigen\* coating to prevent iron pick-up? To form an alkaliresistant surface? To apply a coating of virtually non-porous nickel-phosphorus to many metallic and non-metallic materials . . . without the use of electricity?

Can your product benefit from the hardness of Kanigen coating? Would coating aluminum to increase surface hardness and permit solderability give your product an advantage?

Is uniformity of coating, even on complex shapes, important? Could you lower your costs with a uniform coating of Kanigen that offers a service life comparable to that offered by costly clad or solid materials?

Does coating on plastics (printed circuits, for example) seem worth investigating? There is nothing like Kanigen. Metallurgically unique—not just a substitute for electroplate—it has many unexplored uses. It is available only from General American and our licensees.



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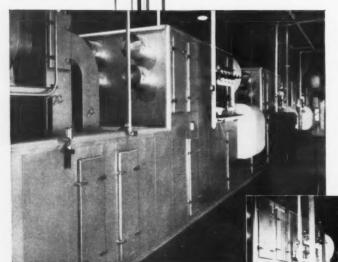
West Coast Plant: 12222 W. Olympic Blvd., Los Angeles 64, Calif.
Phone Bradshaw 2-2143



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Above: Section of ROSS Drying Oven showing 3 temperature zones and control panel at FORMICA COplant Evendale Ohio

At Right: Control apparatus keeps accurate record of temperature in each individually controlled drying zone

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New grades of FORMICA are now being produced to function perfectly up to 482° F. when required. FORMICA'S advanced research and engineering coupled with the advanced design and construction of its ROSS Treating and Drying equipment have been responsible for this FORMICA achievement.

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### CALENDAR OF MEETINGS

Sept. 21-22—American Helicopter Society, 2d annual Western Forum, Hollywood Roosevelt Hotel, Hollywood, Calif. Contact J. H. Overholser, arrangements chairman, Bendix Aviation Corp., 11600 Sherman Way, North Hollywood.

SEPT. 22-24—9th Pacific International Purchasing Agents Conference and Show, Hotel Statler, Los Angeles. Contact S. H. Bellue, Hughes Aircraft Co., Culver City, Calif.

SEPT. 25-29—Master Brewers of America convention, St. Francis Hotel, San Francisco. Contact Henry Henius, convention chairman, 2601 Newhall St., San Francisco.

Sept. 29-Oct. 1—Joint Meeting of Southwest International Mining Assoc. and New Mexico Mining Assoc., El Paso, Tex.

SEPT. 30-OCT. 1—Industrial Development Workshop, University of Wyoming, Laramie. Co-sponsors: Wyoming Natural Resources Board; College of Commerce and Industry, University of Wyoming; Wyoming chapter of Commerce Executives. Contact Ken Monroe, secretary, Natural Resources Board, 210 Capitol Bldg., Chevenne.

Oct. 5-9—World Plastics Fair and Trade Exposition, National Guard Armory, Exposition Park, Los Angeles.

Oct. 10-13—American Mining Congress, 1955 metal mining and industrial minerals convention, Las Vegas, Nev.

Oct. 12-14—Gas Appliance Manufacturers Assoc. annual meeting, Palm Springs.

Oct. 13-14—California Natural Gasoline Assoc., Ambassador Hotel, Los Angeles. Contact E. R. Millett, secretary, 510 W. 6th St., Los Angeles.

Oct. 15—Conference on Standardization of Technical Manuals, sponsored by University of Calif. Extension, UCLA, Los Angeles, Contact Ann Sumner, Office of Public Information, University Extension, Los Angales 24

Oct. 16-19—55th Annual Meeting of Society of American Foresters, Hotel Multnomah, Portland. Contact Lloyd Thorpe, Journal of Forestry, 604 Medical Arts Bldg., Seattle 1, Wash.

Oct. 17-19—American Gas Assoc..Pacific Coast Gas Assoc., Los Angeles, General sessions, Statler Hotel; sales sessions, Ambassador Hotel; operating sessions, Biltmore Hotel. Contact J. E. Kern, Pacific Coast Gas Assoc., 810 S. Flower St., Los Angeles.

Oct. 18-30—34th Pacific Coast Management Conference, Hotel Claremont, Berkeley. Contact Everett Van Every, President, California Personnel Management Assoc., 2180 Milvia St., Berkeley 4, Calif.

. . . More on page 26.



### SERVICE IS HIS BUSINESS Let your

Consolidated Freightways sales representative help you enjoy the finest, most complete motor transportation and distribution service in the West. Whether your shipments are inbound or outbound, large or small, his job is to serve you.

You can rely on him for expert assistance on rates and routings...for advice on methods or equipment. He'll help you plan your shipping...and he can often save you time and money. First, last and always he has your interests in mind—because you are his customer, and at CF the customer is king. For dependable, personal assistance on your transportation and distribution needs, call on your CF sales representative and his service-minded organization.



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### CAINE ROLL FORMED SHAPES HELP PASCOE STEEL CORP. TO ERECT SOUNDER BUILDINGS FASTER



(Above) A Pascoe field crew applies roofing to lightweight structural sections, roll formed for Pascoe by Caine Steel Co. of California.

(Below) This typical Pascoe building reflects the versatile, postwar thinking of Pascoe engineers, whose modern production techniques, both in the rolling and fabrication of structural sections, produce sounder buildings faster. Pomona, California ... In 1947, Pascoe Steel Corporation built their first industrial structure. Today, scores of Pascoe buildings – versatile, weather-proof, of latest design – are found throughout the Western United States.

These modern, basic units are fabricated and erected in record time, thanks to sound engineering principles, mass production methods, alert field crews, and reliable suppliers, geared to keep pace with high-speed, high-volume building demands.

Pascoe's structural shapes are roll formed to exact lengths, and delivered on rigid schedules by Caine Steel Co. of California. These shapes are lightweight yet enjoy an excellent strength-weight ratio, and being roll formed, they are more accurate and economical than identical shapes formed by any other process.

If you have a building problem, investigate the time and money saving advantages of Caine roll formed shapes. Caine Steel roll forming facilities and steel inventory are among the largest in the West.



For complete information and engineering data on roll formed shapes for structural or other building uses, write: Caine Steel Co. of California, 2451 East 23rd Street, Los Angeles, or call LUdlow 8-1211

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#### OCT. 23-25—Western Regional Frozen Food Convention, Hotel Mark Hopkins, San Francisco. Contact Harry Lerner, Executive Secretary, 675 Monadnock Bldg., San Francisco.

#### Ocr. 27-29—Pacific Northwest Personnel Management Assoc., Davenport Hotel, Spokane. Contact Eric Brown, General Conference Chairman, c/o Spokane Chamber of Commerce, or phone RI-5161.

#### Oct. 28—California Manufacturers Assoc., Beverly Hilton Hotel, Beverly Hills, Calif. Contact Luther Nichols, executive vice president, 821 Market St., San Francisco.

#### Oct. 30-Nov. 1—Pacific Northwest Trade Assoc. fall conference, Seattle, Wash. Contact Association office, Vance Building, Seattle 1.

#### Ocr. 31-Nov. 1—International conference on scientific basis of applied solar energy, sponsored by Assoc. for Applied Solar Energy, Stanford Research Institute, and University of Arizona, to be held at Univ. of Arizona, Tucson.

#### Nov. 1-5—World Symposium on Applied Solar Energy, sponsored by Stanford Reseach Institute, Assoc. for Applied Solar Energy, and University of Arizona, Hotel Westward Ho, Phoenix. Contact Henry B. Sargent, president and general manager, Arizona Public Service Co., Phoenix.

#### Nov. 7-8—California Fertifizer Assoc., 32nd annual convention, Hotel Mark Hopkina, San Francisco. Contact Sidney H. Bierly, executive secretary and manager, CFA, 475 Huntington Drive, San Marino 9, Colif.

### Nov. 8-11—American Council of Independent Laboratories, Inc., Hotel Westward Ho, Phoenix, Ariz. Contact Claude McLean, Arizona Testing Laboratories, 817 W. Madison St., Phoenix.

#### Nov. 9-10—Council of Profit Sharing Industries, 8th annual conference, Huntington-Sheraton Hotel, Pasadena, Calif. Contact John C. O'Keefe, field secretary, 919-D E. California St., Pasadena 5.

#### Nov. 14-17—American Petroleum Institute annual meeting, Fairmont, St. Francis, Palace, and Mark Hopkins Hotels, San Francisco.

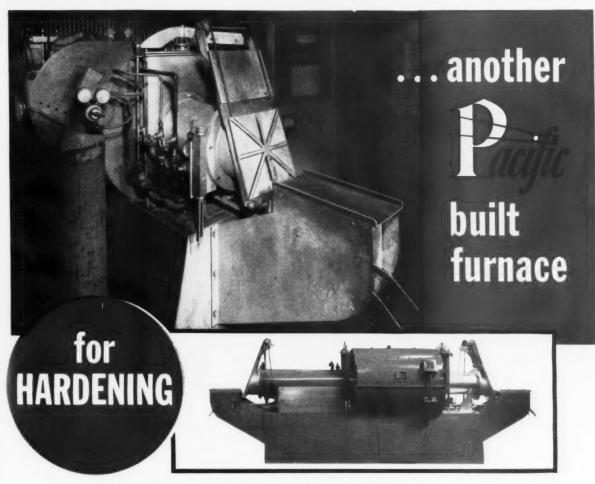
### Nov. 17-18—National Assoc. of Corrosion Engineers, Western regional meeting, Sir Francis Drake Hotel, San Francisco. Contact R. S. Treseder, Shell Development Co., Emeryville, Calif.

#### DEC. 2-3—Northwest Mining Assoc., Davenport Hotel, Spokane. Contact Karl Jasper, c/o Spokane Chamber of Commerce, or phone MA 4822.

DEC. 7-9—Western Frozen Foods Processors Assoc., Hotel Senator, Sacramento. Contact A. H. Harrison, managing director, 244 California St., San Francisco.

#### 1956

JAN. 18—Western Labor Management Relations Conference, Fairmont Hotel, San Francisco. U. S. and California State Chambers of Commerce, sponsors. Contact James D. Gofourth, Calif. State C. of C., 350 Bush St., San Francisco.



### THIS NEW TUBULAR MUFFLE DESIGN PROVIDES UNIFORM QUALITY ... MEETS RIGID AIRCRAFT SPECIFICATIONS FOR CLEAN, BRIGHT WORK!

Bright stainless steel hardening to the aircraft industry's specifications requires close control...and to be profitable, requires top equipment. Valley Heat Treating Co., Burbank, California, met all these conditions with Pacific Scientific's new Tubular Muffle Atmosphere Furnace! This furnace was especially designed for fast, economical heat treating of stainless steels, but can also be used for sintering, annealing and brazing.

At Valley Heat Treating, a pure, dried hydrogen atmosphere is used, and the low dew point that can be held in this furnace produces exceptionally clean, bright finished work.

The unusual tubular construction provides even heat distribution to the circular retort, brings work up to temperature faster, and eliminates "hot spots." Retort life is extended and warpage is held to an absolute minimum.

A special sectional hearth plate spaces the load for maximum and uniform distribution of heat, and the atmosphere inlet is arranged to place maximum protective gases next to the work.

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Link-Belt is a world-recognized engineering firm. Our West Coast plants and offices have large engineering staffs with intimate knowledge of local conditions. Each plant is prepared to carry through complete installations from planning through manufacture and erection.

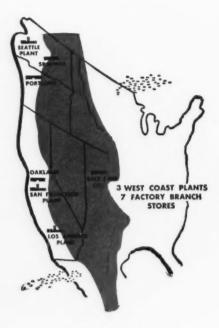


#### convenient warehousing

In the seven major Western industrial areas, Link-Belt maintains over-the-counter service on a complete range of power transmission, conveying and elevating products. There are factory branch stores to serve you at Spokane, Seattle, San Francisco, Salt Lake City, Portland, Oakland and Los Angeles. In addition, 30 authorized stock-carrying distributors in the West stock Link-Belt products.



One source . . . one responsibility for materials handling and power transmission machinery



### modern fabricating facilities

Link-Belt operates three modern plants in the West—at San Francisco, Los Angeles and Seattle. Not only do these facilities help speed deliveries—they also save money on freight costs compared to Eastern shipments.

Turn to Link-Belt for all your conveying, elevating, processing and power transmission needs. Link-Belt West Coast operations include facilities for design, fabrication and erection of complete installations as well as individual products.

With a broad line of equipment and comprehensive engineering background, Link-Belt offers one source for a system tailored to your exact requirements. Call your local Link-Belt office for an expert analysis of your needs.

13,883



California packer uses Link-Belt flat-top packing-table conveyor for efficient, lowcost inspection and packing of celery.



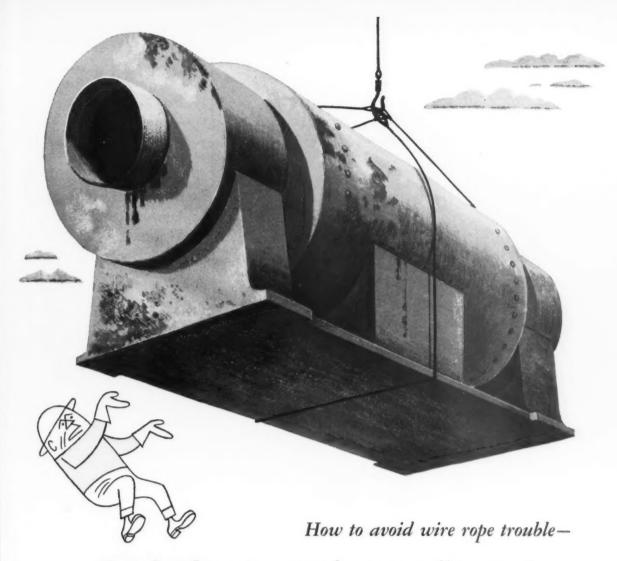
At Idaho sawmill, Link-Belt trolley conveyor carries peeler logs from mill pond to barker in veneer plant.



Inclined 24-in. wide Link-Belt belt conveyor transports crushed, screened lead-zinc ore to 3000-ton capacity ore bin.

LINK-BELT COMPANY: Plants, Sales Offices and Factory Branch Stores at San Francisco 24, Los Angeles 33, Seattle 4. Sales Offices and Factory Branch Stores at Portland 10, Spokane 10, Oakland 7, Salt Lake City 1. Stock Carrying Distributors in Principal Areas.

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### Overloads put a strain on profits, too!

A sure way to shorten the life of wire rope is overloading. Yet many users are tempted to overload because they know from experience that ropes usually can carry more than the recommended working load. But, as a steady practice, overloading doesn't pay! It adds up to unnecessary replacement costs and extra time spent in more frequent inspections...both of which reduce profits. You'll be money ahead if you keep within the working load limits recommended by the manufacturer.

Most users in the West report less trouble, longer service when they rig up with Tiger Brand Wire Rope. No wonder it outsells all other brands. Want more facts? See your local Tiger Brand Distributor or write United States Steel, 1403 Russ Building, San Francisco 6.





### **USS TIGER BRAND Wire Rope**

United States Steel Corporation • Columbia-Geneva Steel Division in the East: American Steel and Wire Division

UNITED STATES STEEL

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Santa Fe people know what it is to handle hot problems. With their "know-how" of moving thousands of freight cars every day, with our powerful fleet of diesels, they can help take the heat off of your freight problems.

There are 60 Santa Fe Offices from 'coast-to-coast' with one in your territory as near as your telephone. Call today.

# THIS MONTH'S COVER

Contributions from amateurs for front cover pictures are invited. Credit will be given.

### MAXIMUM LOG USE means varied facilities

MAXIMUM utilization of the nation's wood resources is dependent upon using each tree for an end purpose for which it is best suited.

At Crown Zellerbach's large specialty paper mill at Camas, Wash., logs are received in bundles banded with steel straps.

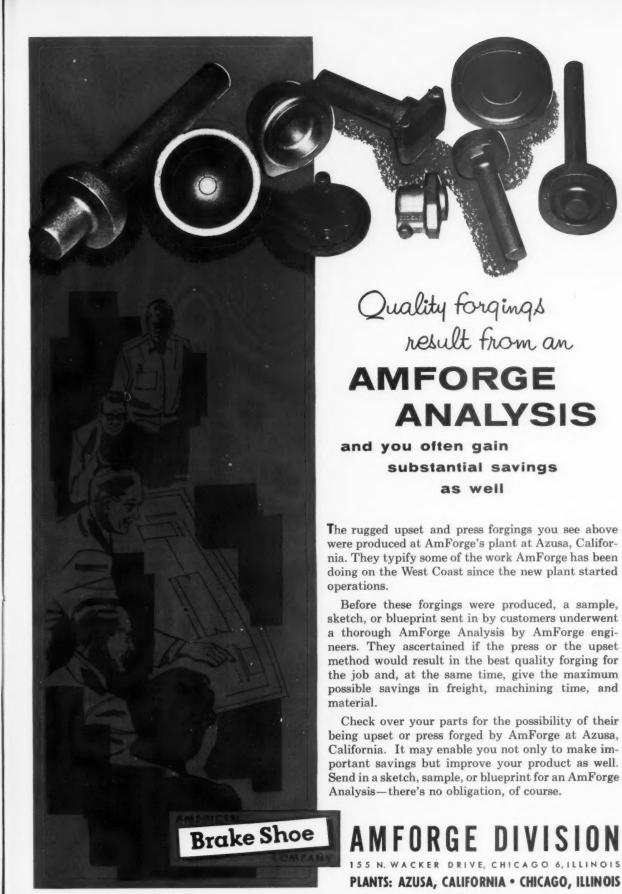
Two hydraulically operated log grapples lift these bundles, weighing as much as 50 tons each, 50 ft. above the Columbia River to the log deck of the company's wood mill.

After being cut to suitable lengths by the cut-off saws shown in the cover photo, logs travel through the hydraulic barker, where jets of water at a pressure of over 1.200 psi. remove the bark and leave a maximum amount of wood fiber. Logs which are less than 34 in. in diameter and 24 ft. long are reduced to chips in a matter of seconds in a whole log chipper.

Logs too large for the chipper or which are to be processed into groundwood pulp are cut to suitable size by the 10-ft. Sumner band saw pictured below.



A 10-ft. band saw is used at Crown Zellerbach's Camas, Wash., mill to prepare logs for groundwood pulp processing.



# What's New

### IN STEEL FROM STOCK

In the news today are many developments of interest to those who specify, buy or work with steel. Ways in which you can raise efficiency and lower costs in your operations may be suggested by the following summary.

<u>Leaded plates—Now lead has been added to E-Z-Cut plate.</u> As a result, E-Z-Cut, which was already considered one of the best free-machining plates on the market, is better than ever. Tests show that New E-Z-Cut cuts even faster, takes a sounder weld and polishes to a better finish than non-leaded E-Z-Cut. And because sulphur content is much lower, New E-Z-Cut is much cleaner steel, free from sulfide stringers. First stocks include thicknesses up through 3".

Biggest stainless steel plates now available from Ryerson stocks. This is the first time that 96" wide plates in thicknesses up to and including 1"—and heavier plates in 80" widths have been carried in stock at plants from coast to coast. Types on hand: 304, 304L, 316 and 316L. Next time, save welding on your big jobs with these bigger plates.

Delivered prices on tubing—Something new in simplified pricing is featured in a booklet just published by Ryerson. For buyers in the 16 metropolitan areas where large Ryerson tubing stocks are located, the booklet gives total delivered prices. There's no figuring to do—no factors to add. For buyers outside these metropolitan areas, a separate book gives prices per 100 feet and transportation charges. And beside every price in all books is a figure that tells you quickly and clearly when you can get a lower price by ordering just a few feet or pounds more. Copies on request.

Give steel-walled buildings a new look with stainless steel siding in mansard pattern, now available for quick shipment from Ryerson. (Galvanized and carbon steel sheets in mansard pattern also available.) The mansard pattern of widely spaced corrugations makes an unusually attractive wall and loss in total sheet area from pattern formation is slight—only about the same as with  $2\frac{1}{2}$ " corrugated—previously the most economical pattern you could use. Maintenance-free stainless in mansard pattern also has many industrial and miscellaneous—architectural-ornamental applications. New Bulletin 70-5 on request.

New sizes of leaded alloys—Increasing demand for New Rycut 50, fastest machining .50 carbon alloy steel, has prompted Ryerson to increase the range of sizes in stock. Hot rolled rounds, both annealed and heat treated, are now available in large sizes—up through  $9\frac{1}{2}$ ". So heavy shafting, gears, cams, etc. can be produced at savings possible only with Rycut alloys.

Stainless pipe for welding applications—Now there's no need to wait for mill deliveries or to use expensive stabilized types when you want stainless pipe suitable for welding. Type 304L pipe, an extra low carbon type that eliminates the need for stress relieving after welding, has recently been added to Ryerson stocks. Size range: Schedule 40 welded pipe in commonly used sizes from  $\frac{1}{4}$ " through 2". Schedule 40 seamless in 3", 4" and 6" pipe sizes.

Supply situation on bars, structurals, plates and sheets—Heavy demand makes it difficult to keep all sizes of these products always on hand. However, we do have thousands of tons of steel ready for quick shipment and, since our stocks are being replenished continually, sizes that are not available today may be on hand tomorrow. So call us next time you need steel.



JOSEPH T. RYERSON & SON, INC.

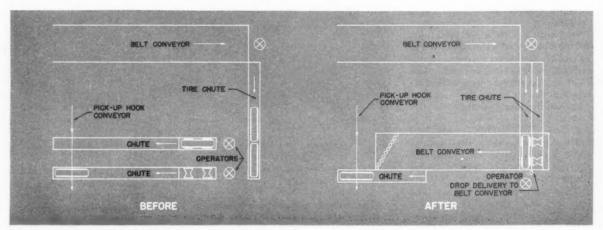
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METHODS principles involved here are: (1) pre-positioned product, (2) two-handed simultaneous motion, (3) drop delivery.

### Spend \$3,500; save \$72 a day

### Industrial engineering achieves this for Firestone Tire on one operation

THE success of an industrial engineer in the development of a methods project is as effective as his knowledge of the job and his ability to analyze the operation.

Developing changes in an industrial process today where company policy, labor contracts, and the natural resistance to change is inherent, requires a selling job from top management to the man on the job.

Our company has recognized that industrial engineers are well equipped to handle this diversified assignment. The staff function of industrial engineering serves the organization under the name of Methods and Standards Department, whose department head is organizationally responsible directly to the factory manager.

In this capacity, the industrial engineer gathers the facts, acts as a liaison between production and plant engineering, makes recommendations, and presents these recommendations to top management.

Basically, there are three sources for



Johnson



Zirges

By
LA VERN M. JOHNSON
and
GLEN G. ZIRGES
Methods and Standards Division
Firestone Tire and Rubber Co.
Los Angeles

the industrial engineer's work assignments:

First, methods improvement items may originate as a result of the industrial engineer's own ingenuity, or the idea may come from the production department or a staff department.

Secondly, directives may come from top management, because of an unfavorable cost situation.

Finally, they may be the result of a new process.

The diagram above, labeled "Before" and "After," illustrates the type of problem that confronts the industrial engineer and the solution developed through a methods project, applying three methods principles.

We have all seen tires with the little bits of rubber that protrude from the tire. These are called pin vents, and it is necessary in the finishing operation to remove them.

In this particular case, because of a new design in tire molds, the number of pin vents was to be increased. Therefore, there was a possibility of an increased cost of the operation. The production department requested the Methods and Standards Department to make a study and report their findings and recommendations. The project was assigned to an industrial engineer for analysis, and his approach to

a solution is demonstrated in the text of this article.

The industrial engineer's first function is to make himself thoroughly familiar with the existing operation. The production supervisor and the people actually performing the operation are approached for opinions and factual information. Past histories in the form of time-study data used in conjunction with observations of experimental runs are required in order to collect a complete set of factual data for analysis. Also, the staff engineers, mechanical, electrical, and structural, are consulted for technical information by the industrial engineer.

With the facts collected and organized, the industrial engineer is prepared to use his knowledge and ingenuity to formulate a solution.

### Former layout

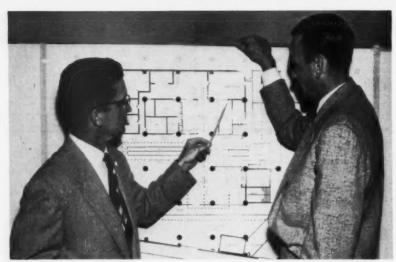
Diagram shows the arrangement of the equipment used to perform the operation of trimming vents before the methods change.

Tires were conveyed to the first operator, who "asided" the tire into a chute to his left which automatically pre-positioned the tire in back of the two pin vent trimming operators. These operators were required to turn 180 deg. to position the tire in the machine.

The machine rotated the tire while the operator held one large trimming knife against the tire and removed the vents. After completing the trimming operation, he depressed a foot pedal which ejected the tire down the chute and positioned it automatically in front of the pickup hook conveyor.

#### Analysis of time-study

The accompanying table shows the time-study data on the old operation. An additional known fact is the speed of the hook conveyor, which is .11



OTHER Firestone plants use this method developed at Los Angeles under R. A. Del Mar, div. mgr.

minutes per hook. The elements of the time-study to be analyzed are:

- 1. "Get and position tire."
- 2. "Trim pin vents."
- 3. "Aside tire."

The element "get and position tire" requires .07 minutes. "Trim pin vents," a one handed operation, requires .10 minutes. "Aside tire" requires .02 minutes. The total required time of these operations is .19 minutes for the cycle.

These were the elements to which the industrial engineer could apply the methods principles of pre-positioning, two-handed simultaneous motion, and drop delivery.

#### Proposed layout and solution

Diagram shows the arrangement made in accordance with the industrial engineer's analysis. The tire continues to travel down the belt conveyor to the first operator, who now asides the tire onto either of the two chutes. The tire rolls down the chute and is automatically pre-positioned in the trimming machine.

The first element "Get and position tire" is eliminated and results in a saving of .07 minutes per tire. In addition to that, the industrial engineer in his analysis observed the one-handed trimming operation and designed two knives to be used in a two-handed simultaneous motion to trim the tire.

"Trim pin vents" was reduced from .10 minutes per tire to .06 minutes per tire. It is necessary in the new operation for the operator to step to the next machine to perform identical operations. The element "Walk to next machine" was added, requiring .02 minutes. The total time required for the new method is .10 minutes per tire.

By consultation with the mechanical engineering section the industrial engineer developed a method of automatically dropping the tire out of the machine and onto a belt conveyor where it would be transferred into a chute and automatically positioned for the pickup hook conveyor.

The cycle time for the total operation was reduced from .19 minutes per tire by the application of the "methods principles" of pre-positioning, two-handed motion, and drop delivery. One trimming operator is now required where formerly two trimming operators were needed.

Cost of the operation was subsequently reduced by \$72 per day. The proposed layout was submitted to the engineering department, which estimated the cost of the equipment and rearrangement to be \$3,500.

The ability of a methods refinement to pay for itself is, of course, one of the most important criteria for its success. It can be seen that this refinement will pay its way in approximately 49 days.

Operation: TRIM PIN	VENTS	
Pick-up hook conveyor speed	Before 11 min./hook	.11 min./hool
Elemental time in m	inutes	
Element	Before	After
1. Get and position tire	.07	.00
2. Trim pin vents		
One hand	.10	
Two hands		.06
3. Walk to next machine	.00	.02
4. Aside tire	.02	.02
Total	.19	.10
Summary		
Crew	2 men	1 man
Pay	.22 min.	.11 min.
Cost of equipment		\$3,500
Savings		\$72 per day
Payout		48.5 days



OFFICIALS watch as a huge vise puts a Douglas fir structure through simulated blast effects.

### Douglas fir passes atom shock test

DOUGLAS fir came through with flying colors in a test of the force of unleashed atomic power. The West Coast Lumbermen's Assoc. subjected a Douglas fir framed-and-sheathed diaphragm as large as a school house roof to pressures equaling those created by an atomic blast, earthquake shocks, and winds up to 145 mph.—simulating hurricane conditions.

An enormous vise with hydraulic jacks created these effects before an audience of officials of the California division of architecture, Oregon engineers, and WCLA technical experts. Expanded use of Douglas fir in school, commercial, and industrial construction using large roof, wall, and floor sections will be recommended as a result of the tests, reports T. K. May, WCLA technical director.

Two tests provide the answer to an important question

### How far can the atom run?

### Blow it up? You've got to work at it

TESTS conducted at the AEC reactor testing station near Idaho Falls, Ida., have proved that a properly designed, water-cooled and moderated nuclear reactor, if allowed to get out of control, will shut itself down before excessively high temperatures would cause destruction of the reactor.

Informed engineers consider this a milestone in nuclear development. It might be considered another step in ascertaining how the dangers can be controlled, as already has been done in the case of atomic powered submarines.

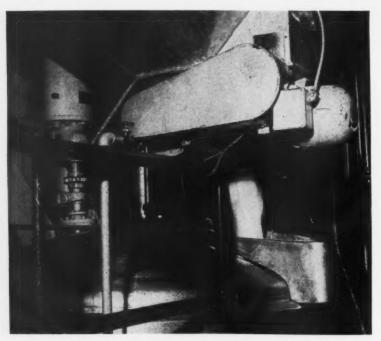
Scientists and engineers actually let an experimental reactor, known as Borax I, run "wild" to simulate hypothetical reactor accidents in which control rods, which normally hold the reactor power to a safe level, suddenly lose control and allow the power to increase at a rapid rate. It was found that eventually the reactor produced sufficient steam to check the rise of power and, in fact, reduce the power to a low level.

This inherent safety factor was tested under possible accident conditions. Later, tests were conducted in which the power was increased tenfold in slightly more than 1/100 second. This produced more violent results than the previous experiment and eventually destroyed the reactor by explosion.

But the fuel fragments all fell within a radius of 200 ft. of the reactor and no appreciable radioactive fallout was encountered at distances of over a few hundred feet. This simulated accident was much more severe than any that might occur in operation.



BORAX 1, test reactor, shut itself down when allowed to run away under probable accident conditions, but when scientists induced much worse than probable conditions, it exploded.



SCREW CONVEYOR allows 3,000 lb. of sugar to flow into lemonade mixing tanks in 45 min.

# Citrus processing becomes mechanized



CONVEYOR MOTORS built-in on sugar larries are plugged into outlets near each tank.

### How sugar caking and waste is eliminated by semi-automatic citrus processing

SUGAR handling is a major job in the preparation of concentrate for lemonade, but automatic citrus processing has made it a handled-with-ease situation at Exchange Lemon Products Co. in Corona, Calif.

Almost 4,500 lb. of granulated sugar go into every 1,000-gal. batch of concentrate for lemonade produced by this member of the Sunkist family. The plant receives sugar in 20-ton truck loads on an inclined ramp in front of a 1,600-bag bulk sugar bin.

A receiving grating in the ramp, serviced by a 45-ft., closed, 12-in. die screw conveyor, is capable of unloading 25 tons per hour. Sugar is conveyed by an elevator to a point 45 ft. above ground level, where by gravity it flows into a 50-bag surge hopper suspended from ceiling beams in the adjacent blending room.

When the surge hopper is filled, the remaining truck-load is diverted to the main bulk storage bin. Thus, the maximum available sugar is always stored in the surge hopper for immediate use in the twelve 1.000-gal. coldwall tanks, where juice is batched and agitated under an 18- to 20-in. vacuum.

In these refrigerated stainless steel tanks, the concentrated juice is brought to a uniform standard of strength, acidity, and sugar content, and the sugar is added.

A Link-Belt "Bulk-Flo" elevator is part of a closed circulator system which enables daily circulation of sugar in the storage bin to prevent caking. When 24 hours pass without withdrawal from the bulk bin, the circulatory system is set to work.

#### Conveyer route

Sugar is conveyed along a route which begins when it falls by gravity into a short screw conveyor which feeds the elevator. It is lifted to the point of gravity above the bin, and flows by gravity back into the 1,600-bag storage facility. Since Exchange Lemon Products Co. uses up to 80 tons of sugar each day, recirculation seldom is necessary.

The 12-ft. square main storage bin, insulated and maplewood lined, is equipped with three Bin-dicators, which indicate (1) when the sugar supply is dangerously low; (2) when it is time to reorder; (3) the stop-filling point. The latter device stops the conveyor and elevator automatically when the bin is full. In addition, there is a bin-level device which gives the sugar level at any height.

#### **Blending** method

In the blending room, 12 blending tanks are arranged in two rows of five each and two in a third row, with a U-shaped operating deck constructed just below their top-filling ports. A U-shaped, 8-in.-wide flanged, I-beam monorail (20 lb. per ft.), upon which run two 3,000-lb. capacity sugar lorries, is suspended above this ramp for service of the tanks.

Lorries are hand pushed, by one of two operators who work the entire 12tank batching line, beneath the surge hopper discharge door. The section of monorail directly beneath the hopper is connected by a Detecto scale, which, preset to the desired sugar weight, automatically records the amount of sugar delivered.

The Detecto scale also automatically closes the air-operated feed gate on the surge hopper when the preset amount has been reached. Sugar gravity feeds from hopper to lorry at 3,000 lb. per minute.

After filling, lorries are pushed around the monorail to the desired tank and switched onto a monorail spur over the tank's port. Each lorry has a self-contained 34-hp. motor which drives a small screw conveyor, allowing just enough sugar to feed into the tanks so that the lemon juice-sugar mixes evenly and thoroughly.

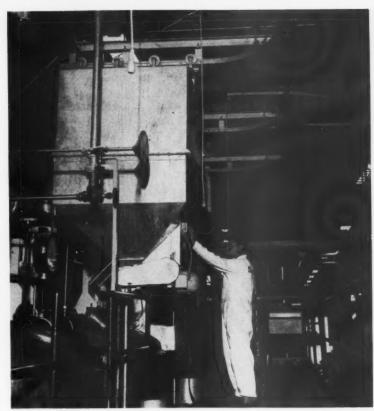
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This lorry's conveyor is geared to dump about 3,000 lb. of sugar in 45 minutes—a speed guaranteeing that sugar will go into solution. Total sugar consumption is tallied at week's end by computation of the printed scale tapes.



LORRIES with a capacity of 5,000 lb. serve ten 1,000-gal. tanks from monorail spurs.



SUGAR storage bin at Exchange Lemon Products Co.'s Corona plant has three Bindicators.



AFTER being degreased, casings are hand-wiped to remove any surface soil or contamination. Scene at Monrovia, Calif., water heater plant at Day & Night Division, Carrier Corp.

## Solvent degreasing problems?

You may find the answers in this simple background data on trichlorethylene

S OLVENT degreasing, using trichlorethylene, has won a place in the field of industrial cleaning in competition with other processes because of its merits when properly applied.

The process is primarily physical in nature, with the solvent being used as a means of solubilizing and washing away undesirable soil from metal surfaces. Experience has clearly shown that in a very high percentage of all cases where problems have arisen in degreaser operations, the problems were caused by inadequate design of equipment, poor maintenance of the equipment, or improper operation of the equipment.

Since in most cases the users of trichlorethylene degreasing solvent are not chemists, they may be at a disadvantage in properly appraising questions and answers of a chemical

It is the purpose, therefore, of this article to present enough of the background on the production and stabilization of trichlorethylene degreasing solvents to allow the user to form sound judgments regarding those few



By
DR. C. E.
KIRCHER
Director of
Chlorinated Solvent
Research
Detrex Corp.
Los Angeles

cases where difficulties may arise due to chemical reactions taking place in a degreaser.

#### How it is made

The bulk of trichlorethylene produced for solvent degreasing is made from the same raw materials by essentially the same process. Acetylene is reacted under controlled conditions with chlorine to form tetrachlorethane. This material is then dehydrochlorinated by one of several processes to obtain trichlorethylene.

The final product is carefully fractionated to obtain a relatively pure grade of trichlorethylene having a rather narrow boiling range and close control on specific gravity and index of refraction. This is the material which, when properly stabilized with small amounts of additives, appears on the market as a commercial grade of degreasing solvent.

When you buy such a solvent, you are obtaining a product which is 99.5% trichlorethylene containing small amounts of stabilizers which have been found by practice to be effective in minimizing solvent breakdown during service life.

In general, two types of materials are used as stabilizers in trichlorethylene; an anti-oxidant or an acid acceptor. It is interesting to note that these same types of stabilizers are used to improve the quality of rubber and also play a fundamental part in contributing stability to many synthetic resins.

From the chemicals available in the above categories, one must select individuals for trichlorethylene which have the proper physical characteristics. The reason for this becomes immediately apparent if one considers requirements of a degreasing solvent.

In practice, the solvent is used as a cool liquid, as a boiling liquid, and as a vapor. It is cycled many times during its service life in a degreaser, and for best performance should have stabilizers associated with it at all times, whether in the liquid or vapor state. Therefore, the volatility characteristics of the stabilizers used should be such as to allow them to move with the solvent wherever it goes.

#### Selecting stabilizers

The final selection of stabilizers for a commercial product must not only satisfy the requirements just mentioned, but also must have been established as performing satisfactorily in extensive field tests. Here, there can be a difference between theory and practice, and for industrial application the knowledge gained from experience is all-important.

The trade is familiar with two types of stabilizer systems: alkaline stabilization and neutral stabilization. To explain their difference, let us go back to the last step in the production of trichlorethylene.

This is a distillation in which a refined cut of trichlorethylene is obtained and in which the initial stabilization of the product takes place. A volatile amine (organic base) is added to the still to prevent any build-up of acidic bodies in the still. Some of this amine comes over with the trichlorethylene and condenses with it, resulting in an initial low concentration of alkaline stabilizer.

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If to this product additional stabilizer of an amine type is added along with an anti-oxidant, the resulting product is known as alkaline stabilized trichlorethylene. On the other hand, if to the still product is added an antioxidant and an acid acceptor of the non-alkaline type, the resulting product is known as a neutral stabilized product.

Both systems meet the fundamental requirements stated above for stabilizers. This does not mean, however, that they are necessarily identical in their performance. The acid acceptors used may be present in different amounts and may have a different ability to tie up acids which may enter or form in the degreaser. Since it is very undesirable to operate a degreasing solvent when it is definitely in an acid condition, stabilization against acidity is very important.

Since an amine type of stabilizer readily accepts acid bodies in a degreaser, this factor can be used to determine by a simple titration how much of the acid accepting stabilizer is present in an alkaline stabilized solvent. It is not as easy to make a quantitative determination of the acid accepting stabilizer present in a neutral stabilized solvent.

In the past, no attempt has been made in the field to determine the amount of anti-oxidant present in either type of degreasing solvent, as the test would, no doubt, be somewhat involved. In general, the trade has relied upon the knowledge and integrity of the suppliers of solvent to offer a satisfactory product based on extensive field tests.

Where trouble has arisen, the user has relied upon the supplier of solvent or equipment to aid him in the solution of the problem. Except for general knowledge, therefore, it has not been necessary for all users of solvent to become experts in the science and art of stabilization in order to use a commercial grade of trichlorethylene effectively in their process.

#### **Testing solvents**

During the early days of trichlorethylene degreasing, few metals other than steel were processed. The type and variety of soils removed from steel were also limited in number. As solvent degreasing earned wider and wider acceptance in the industrial cleaning field, a greater variety of metals were cleaned, and new types of soil were introduced. Field tests had to be relied upon as a true criteria of solvent performance.

Since a degreaser operates in the presence of air and moisture and with an accumulation of soils in the solvent, there is no simple way to duplicate in the laboratory such complex conditions. Since soils are chemical in nature, it is not at all easy or accurate to draw conclusions regarding possible chemical interaction where a variety of soils are present. This is an area in which one may do a lot of speculating but in which the actual facts are hard to prove.

Fortunately, the commercial grades of degreasing solvent have been of such a quality through the years that successful and satisfactory performance has been realized in thousands of cleaning jobs with little or no attention being paid to chemistry. The difficulty and hazards involved in trying to

#### Trichlorethylene facts to remember

IMPORTANT factors for the users of trichlorethylene degreasing solvent to keep in mind are the following:

1. Commercial grades of trichlorethylene are, in general, 99+% trichlorethylene containing small amounts of additives

2. Stabilization is based on the long established principle of adding an anti-oxidant and an acid acceptor to the solvent.

3. In the so-called alkaline stabilized solvent, the acid acceptor is an amine. The amount of such stabilizer present can be determined by simple titration.

4. In the so-called neutral stabilized solvent, the acid acceptor used does not produce alkalinity in the solvent and cannot, in general, be quantitatively determined by a simple test.

5. Both the so-called alkaline and neutral stabilized solvents usually contain some kind of anti-oxidant as part of the stabilizer system. In general, tests are not run to determine the amount of anti-oxidant present in the solvent.

6. Years of field experience on the part of both the producer and user of solvent have shown that the important factors in successful performance depend upon proper design of degreasing equipment, proper and adequate maintenance, and careful operation of equipment.

7. If a solvent user has any questions concerning chemical reaction which might take place between removed soils and stabilizer additives, he should contact his supplier of solvent for clarification and assistance.

8. No more reliable information on the performance of a commercial grade of degreasing solvent can be obtained than that which results from field experience. Any attempt to duplicate actual degreaser conditions in laboratory type equipment is subject to serious error.

 It is extremely important for successful operation that the solvent not be used for extended periods of time in a strongly acid condition.

10. A stabilizer system designed specifically for use with one metal or one type of soil may not perform equally well with all metals and all types of soils. A generally well stabilized solvent is to be preferred for most applications.

evaluate the performance of a degreasing grade of trichlorethylene by conducting a single or series of simple laboratory tests is immediately apparent to the experienced technical man.

The problem is similar to that of testing a paint system. While many laboratory and short term tests have been proposed, it is well recognized that the most valid data is obtained by long term actual tests in the field. In developing a properly stabilized trichlorethylene, the producer has in mind a solvent which will perform in a degreaser, processing a variety of metals carrying numerous soils, rather than a solvent which would show up well in a bench scale test.

#### Rely on experience

A stabilized solvent designed for use in the laboratory, in glass equipment, and operating under the restrictions of such equipment and evaluated by short time accelerated tests, might well be expected to show serious defects when put to use in degreasers operating under plant conditions. Rather than attempt to evaluate a commercial degreasing solvent on a possibly inadequate laboratory basis, it is much sounder to rely on actual field experience for performance data.

The industrial success of commercial trichlorethylene degreasing solvents is, on the whole, very good and proves that when these solvents are used in properly designed and maintained equipment, they contribute importantly to the art of metal finishing. If for any reason the user of degreasing equipment thinks his operation is being adversely influenced by possible chemical reactions, he should discuss the matter with his solvent supplier, who will know what stabilizers are involved.

#### Chemical reactions

Since, in general, the stabilizers used are more reactive chemicals than the trichlorethylene, they are more likely to be involved first if chemical reactions are taking place. Without an accurate knowledge of the stabilizers present, even a technical person would be employing speculation rather than science if he made statements regarding specific chemical action which is taking place.

A simple example of this is as follows: Commercial grades of trichlorethylene have been marketed which would darken in color on the addition of iron chloride. Actually, such solvents were used successfully for years degreasing iron and steel. This indicates that such a chemical test should not be used for evaluation purposes.

In the field, when pH measurements are used as part of the process control, it is well to remember that only amine type materials (organic nitrogen bases) can account for a pH value above seven when measured in an aqueous medium. Various acidic bodies can account for a pH value below seven. It is also important to recognize that the pH of a distillate can differ appreciably from the pH of the solvent from which the distillate came.

Determination of acidity by measurement of pH does not give a complete picture of the solvent's condition or indicate its rate of becoming acidic.

#### Sound technology

The foundation on which trichlorethylene degreasing of metal rests is based on sound technology and literally years of valuable field experience. For either the producer or user of such solvents, this field experience is invaluable and forms a true and reliable basis for judging the merit of solvents and solvent degreasing as a process.

## **Doctor of yards**

How P-I-E eliminated a delay in their trailer maintenance system

"GET a doctor for that donkey!" someone must have screamed at Pacific Intermountain Express Co.'s Denver, Colo., shop. "If the donkey can't get the patients to the doctor fast enough, let's take the doctor to the patients."

So the engineers, always thinking, got a war surplus chassis, added some power, mounted it with Doc's delicate instruments—a compressor, air tank, grease tank, tire rack, ladder, and hoses for greasing, inflating tires, and operating pneumatic tools such as lug wrenches—tagged it "Doctor of Yards," and sent it out to the patients.

These patients, in the form of truck trailers, were being brought to the doctor, a maintenance and service shop, by the Yard Donkey—a small tractor for moving trailers at terminals. But, the donkeys were being overworked and delays were encountered in trailer servicing.

Now mechanics drive the Yard Doctor to the trailers and service or repair them. P-I-E has six service wagons in use. Two are in Los Angeles, two in Oakland, Calif., and one each at Portland, Ore., and Denver, Colo. They save at least one manhour per trailer on routine service checks.

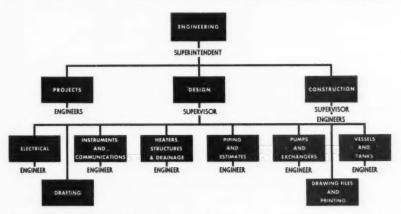


YARD DOCTOR, designed by P-1-E's Denver shop engineers, takes maintenance facilities to carrier trailers. Old system involved towing the trailers to the shop for routine maintenance work.

## Who keeps our plants humming?

Highlights of papers presented at the 2d Western Plant & Maintenance conference

#### How to handle new projects on time



ORGANIZATION of Union Oil Co. of California's Wilmington refinery engineering department.

By JOHN D. SCHULZ Superintendent of Engineering Union Oil Co. of California Wilmington, Calif.

c

OVER 500 maintenance people handle the routine maintenance and numerous new work projects and major alterations at our refinery, and we minimize down-time and secure full advantage of this investment by:

Determining requirements in advance.

2. Distributing the work.

3. Closely coordinating design, materials, and construction.

4. Competitive bidding.

New work projects are generally

handled by the refinery engineering department, the organization of which is illustrated by the accompanying chart. The design group is responsible for preparation of estimates and equipment design. Engineers are assigned a specific type of equipment to handle and project engineers operate as a design group using the services of outside engineering firms for fluctuating work loads.

Engineering projects are instigated by requests or recommendations from the maintenance department, the process department, engineering inspection, or the operating department. However, engineering is not started until an estimate request is made by the operating superintendent and the expenditure is approved. Each project, when received, is assigned a file number, and all work and material are maintained in that file.

We establish job priorities on the basis of maintenance and turnaround requirements which are consistently changing. Therefore, no attempt is made to establish work sequence on a priority basis. A six-month over-all schedule is kept by the design engineers of their assignments and a weekly design list sent to the operating superintendents of the engineering schedule for that week.

By C. A. GALLAHER
Plant Engineer
Aeronautical Division
Robertshaw-Fulton Controls Co.
Anaheim, Calif.

ON'T operate your small plant out of your coat pocket. Organize your engineering, dispatching, estimating, supervision, and manpower. We have reduced our staff in the plant engineering department from 29 people to 23 people by strong emphasis on standardization, simplification, engineering, and dispatching.

These 23 people—19 maintenance men, one dispatcher, two engineers, and one foreman—maintain 83,000 sq. ft. of space which houses an operation producing about 70 different high precision devices. Machines used are held to a tolerance of .0002.

Preventive maintenance has also

#### Organization in the small plant

been simplified and standardized. Any operation that is recurrent at regular dates is put on Productol boards. Operations that are performed at regular intervals, every 30 days, 60 days, etc., are put in a file section. Maintenance work is scheduled from these boards and files.

Any supervisor can call the dispatcher in case of trouble calls. The dispatcher is authorized to make out work orders and dispatch a maintenance man to take care of the trouble call. There is one maintenance man of each skill in the shop at all times to answer such emergency calls.

A work progress report prepared at

the end of each week, indicating work accomplished during the week plus a complete backlog of work for the following week, is a great aid to keeping maintenance work under control. If a discrepancy between available manhours and backlog of manhours becomes too great, we know that we must work overtime or hire additional personnel.

The work progress reports always contain some non-urgent projects, which may appear for weeks or even months before they are completed. This always gives us a backlog of work to be completed in spare time.

. . . More on next page.

#### **PLANNING: The small plant**

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COMBINATION of lubrication charts insures regularity and quality of machine lubrication work.

By J. T. SNEDDEN
Chief Plant Engineer
Norris-Thermador Corp.
Los Angeles

AT Norris-Thermador, we believe that maintenance should be set up in six different steps. These are:

1. Be a part of the group that selects the machinery and equipment for the operation. Select the right machine to do the job and establish the line rate for maximum use of the equipment.

Recognize the cost of the equipment and keep simplicity of operation in mind. If possible, specify that replaceable parts be standardized, lubrication points be easily accessible, and that the manufacturer prove his design with a guarantee. Teach the operator, during an adequate training period, to care for the machine.

2. Gather complete equipment data and establish a recorded control system. Compile all information such as speed of equipment, capacity in tonnage, volume, performance rating, etc., in files. Establish an equipment number so duplicate machinery can be identified. List all vulnerable parts by catalog number, etc. Establish historical records to indicate future use and care of the machine.

3. Identify the lubrication require-

ments of each piece of equipment and record the equipment by location in the plant. Set up a type of lubrication for each location and the frequency of application. Search constantly for better lubrication products.

4. Prepare for scheduled and emergency repairs. Use your records for material on hand to make emergency repairs and have a method set up for immediate action so down-time will be minimized. Historical records are the best basis for planning scheduled repairs.

5. Set up a program to keep building, grounds, and machinery in a neat orderly condition. Develop a program of good housekeeping. Keep machinery painted and have a uniform color code. Keep aisles, parking places, and work in process areas clean and well defined. Clean up every project as part of that job. Paint all manifold pipes in a safety color code so they can be easily identified.

6. Construction and installation is a task of being sure that the plant layout provides ample room and is conducive to good maintenance procedures. Creating the layout and keeping it current with plant requirements should involve practical ideas from the production department, industrial engineer, and management.

. . . More on page 44.

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Tide Water Associated's Avon, Calif. Refinery Figure 3  CRAFT Pipe Shop (Div 2)  DATE December 23, 1953						FORE	MAN_	R. R.	Lowrey	_ PA	GE_	1_ OF	DAILY	WORK SCHEDULE	
ACCOUNTS CHARGEABLE		COMPLETE TOBAY (V)	JOB IDENTIFICATION		TIME DATE		ESTIMATED MAN HOURS REVISED ORIGINAL		ACTUAL MAN HOURS EXPENDED	MECHANICS HELPERS		REGD.	REQUEST  MECHANICS  HELPERS  HEE.	REMARKS	
ES HG	AFE. ACCOUNT			2 Head Hechanics 18 First-class		START	COMP.	FIELD	SHOP			HRS.		HES.	
			18 Helpers 7 Men up 1 Helper from Boiler Shop 15 Helpers from Labor Dep't.	-											
			Zone #1 - 0/0												
			Area Mechanics	1						3/3	8				
5013	903		Hook up acid cars daily, Tract #1	1	1-5	12-31	758 480		700	1/1	4	50		Area	
17064	2541		Unbolt elbow, Santa Maria Tower, #2 Gas Plant		10:00	12-24	8			1/1		8			
17037	922	H	Unplug 1/2" steam line from orifice to #15 steam meter - Solvent Treating Plt.	2	12-23	12-31	4			1/1		4		Staging	
			Zone #2 - 8/40/40												
			Area Mechanics	-						3/3	8				

DISTRIBUTION of this daily work schedule organizes maintenance tasks in the three zones at Tide Water Associated Oil Co.'s Avon refinery.

#### PLANNING: The large plant

By C. C. CARMINE Superintendent Maintenance and Construction Avon Refinery Tide Water Associated Oil Co. Associated, Calif.

OUR maintenance and construction department is organized into four divisions — field execution, project planning, daily planning, and office.

The field execution division is headed up by the assistant superintendent, who supervises and coordinates work performed in the field and in the shops. General and coordinated supervision in the field is provided through area and zone foremen. A craft coordinator keeps the 15 different crafts in the field coordinated.

The project planning division is headed up by a chief project planner who has six assistants, one clerk, and one typist. The six planners in this group are engineers. Three of them plan and follow up on the field work of projects; two plan the major process unit shutdowns, of which there are 35 to 40 per year; and one has the primary responsibility of machinery inspection and preventive maintenance for pumps, compressors, turbines,

blowers, steam engines, and other rotating machinery except electrical equipment.

The daily planning division is headed up by a chief daily planner who has three daily planners and a materials man located in a central planning office. This division also includes a zone planner for each of the three zones. Here, maintenance and repair jobs which have been authorized by operating superintendents and which do not exceed \$1,000 in estimated cost are planned. The daily planners receive the finished job orders and use them in daily scheduling of manpower.

The office prepares daily work schedules and handles administrative duties of the maintenance and construction department.

## By B. P. LaFORGE Superintendent Buildings and Equipment Consolidated Engineering Corp. Pasadena, Calif.

In arriving at the amount for our maintenance budget at Consolidated, we first listed the services planned and required. These are custodian, security, carpentry, painting, equipment, and plant development. A total figure for the annual budget was obtained by noting the costs for the past three years and the per cent of increase in production and personnel and arriving at a suitable figure.

The past five years' experience with the particular demands of our plant have given us a scale for operations which seems to work out fairly accurately. For instance, it has been pretty well established that one man can care for a 7,000-sq. ft. area in the custodial

#### Maintenance control is important

line of work and keep it up to standard.

Our security figures are probably a little out of line because we still maintain several widely separated locations. This reduces the number of stations a guard can cover at proper intervals.

Our equipment maintenance costs are units based on equipment investment.

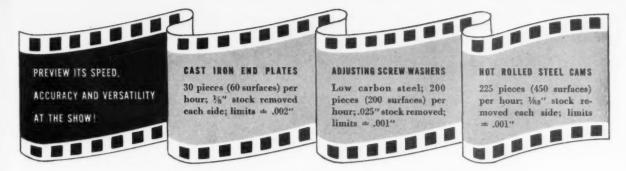
The cost of each requirement in the maintenance of each piece of equipment is recorded and used as the basis of budget requirements with an allowance made for emergency costs. By standardizing on spare parts, we keep

less than \$1,000 tied up in them.

One portion of the equipment maintenance cost is devoted to overtime pay for Saturday work. Our men are not union members and, in order to avoid excessive down-time, crews work every other Saturday on an overtime premium pay basis. We find that the expense of this 10 or 12 man crew is small when compared to the production savings.

This program has kept in 90% production many machines that have been written off as having come to the end of their life expectancy of seven years.

. . . More on page 46



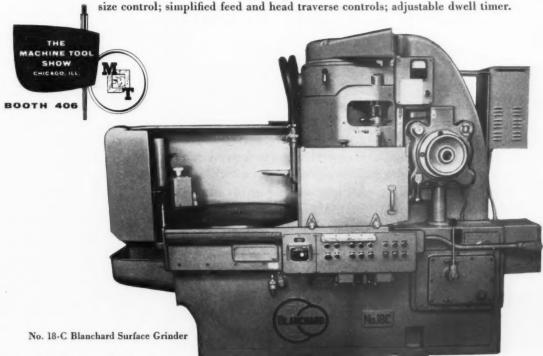
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## Preventive care pays for itself

By OTIS W. HOWARD General Supervisor, Maintenance Hughes Aircraft Co. Culver City, Calif.

THERE is no definite pattern for establishing an effective preventive maintenance program. Each plant must work out its own plan in line with its own peculiarities, but generally, a good program is derived from the following:

1. Promotion. The first step is to point out the advantages of preventive maintenance. It assures high mechanical efficiency and reduces overtime pay. It provides an opportunity to standardize on all parts and materials. This is of particular advantage to Western plants which depend upon Eastern suppliers for replacement parts — delivery time often contributes more to delay than repair time. Cost of repair can be more accurately estimated when time studies are made on repetitive jobs called out on a preventive maintenance schedule.

2. Organizing. Organizing the plant for preventive maintenance can be done by classifying equipment into five main groups. These consist of main utilities (sewer systems, water lines, power lines, etc.), residual equipment (small power tools, office machinery, etc.), machine tools (lathes, mills, jig borers, etc.), rolling stock, and custodial equipment and functions.

Subsections within each of the five major groups are then established and schedules and records established.

3. Operation. Record systems must be so set up that they automatically serve as a reminder of work to be performed. Check sheets should be established for maintenance men to insure that each point of work required is performed. A cost accounting system should be established that will enable quick and effective review at any time. Maintain a good equipment inspection system to supplement scheduled work.

A preventive maintenance program cannot solve all maintenance problems. No more than 85% of all maintenance items can be scheduled. But this drawback does not compare with such a program's advantages. It is merely one of the problems that must be overcome in order to gain the reward of a smoothly running preventive maintenance program.



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## **Industrial engineers** IN SMALLER PLANTS

They effect big savings while also carrying part of the load

E. PAUL **DeGARMO** Professor of Industrial Engineering University of California Berkeley



PART 1 of this article, which appeared in Western Industry in July, proved that many small plants can not only afford an industrial engineer, but should not be without one. The next question that naturally arises is how to fit the industrial engineer into a small plant oragnization.

Responses from the first installment indicate that many plants are ready to adopt industrial engineering. Here is the story of how it may be done to good advantage by the smaller plant.

THERE is no single solution to this problem but two cardinal rules should be kept in mind. First, he should be assigned some of the routine staff functions which currently are being done by the plant manager and the foremen and thus free them for what should be their primary functions-broad management and supervision, respectively.

Second, his assigned staff duties should be such that he has adequate time to bring about the savings which are available through the application of industrial engineering principles and techniques. Failure to observe either of these rules would be a vital error and, fortunately, the two are compatible.

The recent studies by Davis and Jones, which have been published in WESTERN INDUSTRY, show conclusively that small businesses are neglecting a number of important managerial functions, and that when they are done it is the plant manager, and to a much lesser degree the foreman, who takes care of them.

While some of these duties should be assigned to the industrial engineer. and through them he may achieve some economies, it would be a perversion of purpose to so load him with detail and routine that he has insufficient time to do the necessary thinking and investigation which will enable him to achieve the real economies

which his employment was intended to produce.

One logical way of integrating an industrial engineer into a small plant of 10 to 15 employees would be to give him responsibility for everything relating to materials except the direct processing of them. This would include the eight functions listed in Table 1 on this page.

It should be noted that all of the functions listed are being done in every plant. This will be doubted by some at first, but if they were not being done, materials would not get into the plant and be processed.

They perhaps are being done inadequately and informally, but they are being done. In most cases they are being done by the plant manager or the foreman. Yet actually none of these should be their primary func-

The industrial engineer, however, is particularly well qualified to carry out these functions. He has had a thorough technical training in the nature and properties of materials, in their processing, and in the theory and techniques involved in planning, control, and quality control. Thus he is capable of performing these functions well. In addition he would be in a position

#### TABLE 1

#### Initial responsibilities

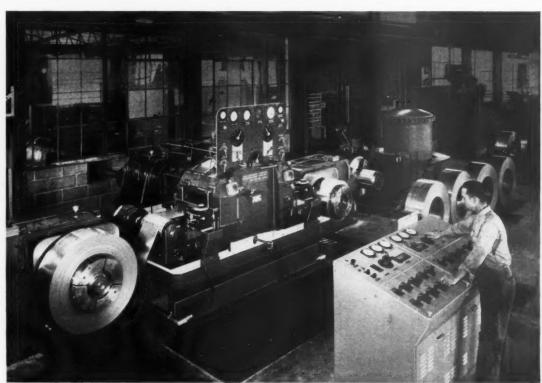
- 1. Specification of materials.
- 2. Ordering of materials.
- 3. Inspection of materials. 4. Inventory control & storage.
- 5. Production planning and scheduling — routing and movement of materials and scheduling of machines.
- 6. Quality control.
- 7. Control of scrap.
- 8. Finished goods inventory control

#### TABLE 2

#### Redistribution of materials-related functions as plant size increases

First growth Further growth 1. Production planning and control Industrial engineer Industrial engineer 2. Specification of materials Industrial engineer Industrial engineer 3. Control of scrap Industrial engineer Inspection department Stores department 4. Inventory control and storage Industrial engineer 5. Finished goods inventory Stores department Assistant manager 6. Quality control Inspection department Inspection department 7. Inspection of materials Receiving clerk Inspection department 8. Ordering of materials Assistant manager **Purchasing department** 

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to effect considerable economies in relationship to materials usage.

Giving the industrial engineer responsibilities for these functions would remove these essentially routine staff functions from the two key line men—the manager and the foreman. It would give him a place in the organization which would be important, but should in no way conflict with the duties of the manager or the foreman.

In addition to the responsibilities listed in the accompanying box, the industrial engineer should, of course, be given the responsibility for methods studies, production standards, plant layout, and for establishing and administering some type of effective incentive system. These are the areas where he probably will produce the greatest savings. He should have at least one-half of his time available for these activities.

The industrial engineer should also play an important role in all decisions relating to plant expansion, equipment selection, and product design. However, these decisions usually should be made by a committee of which the industrial engineer should be a member.

#### Growth modifications

While the organization just discussed would be good in a plant having up to about 15 or 20 employees, it is obvious that some modification would have to be made for larger organizations. It is certain that one engineer could not handle all the duties indicated in a larger plant. Such modifications might take two possible directions.

In some cases, supplying the industrial engineer with some clerical help would solve the problem satisfactorily. Much of the work connected with the control of materials can be reduced to routine which could well be handled by a clerk and thus permit the engineer to retain supervisory control. This method of modification is the one which probably should first be used as the organization size increases.

In larger plants, however, or as the size of an organization increases, a second modification probably would be employed. This involves assigning some of the suggested materials-related activities to other personnel who are available in a larger organization. The important question then is, which activities and when?

The materials-related activities were listed previously in the general order of their occurrence during the production process. Table 2 on page 50 lists them in a different order: those at the top of the list are the ones that should be retained by the industrial

engineer, and those from the bottom upward would be assigned to other persons in the organization as it became necessary and the suggested personnel were available.

#### Only suggestions

If the suggested positions, or similar ones, are not in existence in an organization, it is probable that the function should be retained by the industrial engineer, at least until growth makes further distribution necessary and economic. Those functions above the dotted line in the table should be retained under the supervision of the industrial engineer as long as the organization remains in the small plant class — and frequently well beyond that point.

Obviously, the suggested assignment of these functions given in the table are suggestions only. Many modifications would be justified, depending upon the size and nature of the individual organization. However, if the functions near the bottom of the list are arranged properly for the particular organization involved, and assigned to suitable personnel when such personnel are existent and necessary

in the organization, no difficulty should be experienced.

There is, of course, more than one way in which an industrial engineer could be integrated into small plant organizations. Those discussed here are merely cited to show that there is a logical method of doing this so that a rational and clear division of responsibility and authority exists.

This is important so that existing employees will feel that the industrial engineer is a real help to them and is not usurping their primary prerogatives. Obviously, he must be in a position to initiate and exercise some control over those functions wherein he may achieve the savings that he should bring about. This calls for a delineation of responsibility and authority.

If it is accepted that an industrial engineer can produce substantial savings in your plant, the first important decision is to decide to employ one. A little careful thought will produce the second important decision as to the way in which he should fit into the organizational structure. In fact, if you will get an industrial engineer he will be able to help you solve that problem!

Method of determining whether your plant can afford an industrial engineer

Α.	Annual cost of direct labor	\$	******
В.	Probable savings in direct labor (30% of Line A)	xxxxxxxxxxx	\$
c.	Total annual cost of materials	\$	*******
D.	Probable savings in materials (10% of Line C)	xxxxxxxxxxx	\$
E.	Value of average inventory	\$	******
F.	Annual cost of carrying inventory (Suggest 6 % of Line E)	s	XXXXXXXXXXXX
G.	Probable savings in inventory cost (10% of Line F)	xxxxxxxxxx	\$
н.	Total probable savings (Sum of Lines B plus D plus G)	*******	\$
I.	Estimated annual cost for industrial engineer (Suggest \$6,500)	******	\$
J.	Net saving per year (Line H minus Line I)	******	\$
K.	Equivalent sales to produce same profit Line J divided by your % profit per dollar of sales, before taxes)	XXXXXXXXXXX	\$

(NOTE: This table was incorrectly reproduced in the July issue.)
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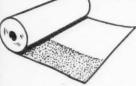
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Please send specifications and details on new FIRE-CHEX PERMA-TOPP ROOFING.

Please have a Carey Industrial Engineer call.

Name\_\_\_\_

Firm\_\_\_\_

Address\_\_\_\_\_\_\_Zone\_\_\_\_State\_\_\_\_

#### **PALLET CONFERENCES** planned for West Coast

TWO CONFERENCES will be held on the West Coast for wooden pallet manufacturers in October. Sponsored by the National Wooden Pallet Manufacturers Assoc., all wooden pallet manufacturers located in the eleven Western states have been invited to attend

Reports and statistics on the growth of the wooden pallet industry during the past ten years and on the future potential of the industry will be presented. The future has been projected to the year 2000 on the basis of recent economic studies of the lumber

Manufacturers who attend will also be afforded an opportunity to discuss current marketing problems.

One conference will be held at the Sheraton-Town House Hotel on October 14 in Los Angeles; the other is scheduled for October 21 at the Sheraton-Palace in San Francisco. Each meeting will occupy a full day. More information may be obtained from the NWPMA, 215 Barr Build-ing, Washington 6, D. C.

#### LP-GAS STANDBY 180,000 gal. for Ford

FORD Motor Co.'s new San Jose plant has provided against emergency interruptions of natural gas service by installing an LP-gas standby system with a capacity of 180,000 gal., which vaporizes 3,000 gal. of propane

The storage is divided into six 30,-000-gal. tanks located in two banks of three. There are three tank car unloading stations and two for trucks. the latter so arranged that both the tank truck and the trailer can be unloaded simultaneously, thereby reducing truck unloading time. The unloading lines are equipped with eight flow-check valves which give visual proof that the transportation vehicle is emptied.

Installation was made by American Liquid Gas Corp. of Los Angeles, and the equipment includes two Brunner unloading compressors, two Fuller air compressors, and a Cutler-Hammer-Askania flow ratio system.

#### TITANIUM PROBLEMS under study at WSIT

ONE of the many problems that have been encountered in the development of titanium involves its poor bearing properties. Dr. Zelezny, metallurgist of Washington State Institute of Technology's Division of Industrial Research, is studying the physical metallurgy of the metal as a part of the division's research work on the

Most of his attention has been given to improving the bearing qualities of titanium. Special equipment has been designed and built to test the possibility of nitride processing to accomplish this improvement. Samples are subjected to high temperatures under nitrogen or ammonia atmosphere.

Thus far, means have not been found to obtain a hard layer of sufficient thickness for practical bearing use, but Dr. Zelezny expresses hope for this technique.

The high cost of titanium is due primarily to difficulty of refining it from its ores. A special electrolyzing furnace has been constructed in the division's mining experiment station and tests of the properties of fused electrolyzing baths have been made. Scientists at the station hope that the results will provide a lead to the answer to the refining problems.





## Add <u>life</u> to your housekeeping program

Convair did with an awards system

 ${
m H}^{
m oW}$  to keep a plant, whether large or small, both safe and clean is aften a vexing problem. Convair at San Diego found that adding life and incentive to the routine tasks so important to plant safety and cleanliness was the answer to the problem.

This life, which has been injected into the housekeeping system in the form of a contest, has had outstanding results. One department has entered its third year of the contest without a single violation to its discredit. The plant's general appearance, condition, and safety has been increased immeas-

A good-housekeeping contest, based upon the number of violations of listed housekeeping rules and duties, was established. The department having the least number of violations resulting from unannounced inspections receives a trophy. Running accounts of the department ratings are published monthly. Ratings are determined on an average-number-per-

employee basis. Lists of rules, which when violated constitute a demerit, were prepared in check-sheet form. They were broken down into three major categories—cleanliness and orderliness, safety, and fire.

#### Cleanliness and orderliness

1. Keep areas free of equipment when they are marked or painted "This area to be kept clear."

Keep shelves under benches clear at all times except where jobs require the storage of parts during the process of fabrication.

3. Facilities should be provided for lunch boxes and clothing. Such items should not be draped over chairs or hung from nails near working areas.

4. A rack should be provided and a location designated for storage of tools.

5. Machines should reflect reasonable effort expended to keep them clean. (Legitimate working dirt such as shavings, drillings, and chips for the job at the machine will be tolerated, but a mixture of chips in the machine bed would indicate improper

6. Keep floors free of grease and oil and cover any spillage with "quickdry" immediately.

7. Do not leave pieces of welding rod on the floor. (Large quantities found constitute a safety violation also.)

8. Keep large pieces of stock out of mixed salvage in the outgoing area. 9. Keep toilet areas clean.

10. Conditions in job working areas should reflect an effort on the part of supervision to keep things neat and tidy. (A certain amount of leniency will be extended here and any department in the process of being re-arranged will be overlooked so far as appearance is concerned.)

11. Keep supply cabinets neat and clean as far as practical and keep janitors' supplies and equipment in cabi-

net provided for this use.

12. Give areas under stairways special attention.

#### Safety

1. Enforce eye protection in all drilling operations.

2. Grinders and other machinery must be properly guarded and safety signs posted conspicuously.

3. Keep stands, ladders, platforms, docks, etc., safe and secure.

4. Never overload materials handling equipment.

5. Truck operators must perform work in a safe and careful manner.

6. Never operate unsafe equip-

7. Keep rolling stock off floors. 8. Flag all tools or equipment which necessarily extend into aisle or over the edge of moving equipment.

9. At all times, give every safety consideration to handling of explosive materials such as gas tanks, oxygen cylinders, dynamite, etc.

#### Scoreboard

COMPUTED on an averagenumber-per-employee basis, department ratings are published monthly. Department with the lowest rating receives a trophy. Here is a sample of the monthly running account:

> Average violations per employee

	April	March	
Fabrication, Plant 1	.000	.019	
Fabrication, Plant 2	.000	.001	
T-29 Final	.000	.000	
340 Major & Final	.004	.012	
Field Operations	.004	.024	
Tool Mfg., Plant 2	.008	.045	
Plant Engineering	.011	.012	
Mfg. Control, Plant 1	.015	.016	
Mfg. Control, Plant 2	.016	.031	
Electronics	.017	.000	
F-102 Major	.023	.025	
Material	.023	.000	
T-29 Primary &			
Major-F-102	.027	.009	
R3Y Major & Final-F-102	.030	.004	
Experimental	.035	.000	
Tool Mfg., Plant 1	.036	.000	

#### Fire

- 1. Keep fire extinguishers accessible and in a properly designated location.
- 2. Remove flammable and volatile liquids, if spilled on the floor, immediately.
- 3. Use red safety-capped containers provided for flammable or volatile
- 4. Provide and use suitable facilities for rubbish or oily rags.
- 5. Keep floor drains free and clear at all times.
- 6. Maintain special extinguishers required by law where material of a flammable nature, such as magnesium, etc., is being machined.

7. Keep suitable fire protection equipment in and around drum storage areas where large quantities of flammable liquids are stored.

8. Provide and use drip pans or drains of some type in areas containing drum racks where paint, oil, or similar items are being dispersed.

Two separate inspections are made periodically, one by the fire department and the other by the safety section. They are made on an individual basis and rating points are determined on the basis of total violations within each of the three categories.

Each supervisor is contacted by housekeeping inspectors and invited to accompany them on their tour of

The plant is divided superintendentwise and layout drawings provided are the authority for boundaries of each department. Any variation from the layout constitutes five demerits.

#### FOOD RADIATION research evaluated

AN EVALUATION of progress in food-radiation research recently conducted by H. C. Diehl, director of the Refrigeration Research Foundation, Colorado Springs, Colo., indicates that nearly all of the 50 authorities surveyed hold out hope that radiation will be beneficial in the respect that it will reduce microbiological problems in food preservation.

With some foods, notably fresh

meats, radiation at moderate dosage levels has had a "pasteurizing" effect. It has extended storage life of the foods under refrigeration.

Sufficient radiation to destroy all microbial life, however, changes the product in a number of ways, many undesirable, that are not yet fully understood.

A number of food and drug items may be commercially irradiated within a few years- if high cost does not intercede. Mr. Diehl summarizes his survey in a single statement, "Results are very valuable, but not revolution-

#### PREPACKAGING increasing rapidly with apples

THERE may be as many as 20 to 25 million bags of apples shipped from the Pacific Northwest this year, according to Earl W. Carlsen, director of the Fruit Industries Research Foundation, Yakima, Wash. The increase of prepackaged apples may be 30% to 50% over 1954, which had topped all previous years.

Figures for 1954 have been supplied to WESTERN INDUSTRY by Mr.

Carlsen as follows:

Type of pack	hoxes (000)	Per cent of
Standard wooden box	16,512	81.8
Tray-packed cartons	1,801	8.4
Poly-bagged cartons	1,456	6.8
Cell-divided cartons	223	1.0
Bulk in cartons	206	1.0
Miscellaneous	214	1.0
Total	20,412	100.0%

Mr. Carlsen reports an increase in trend toward the use of fiberboard containers for the prepackaged apple. Tray-packed apples and most loose apples are shipped in fiberboard. He expects that very likely the tray pack will be expanded, for the demand, particularly from chain store buyers, has increased, and mechanical packing is being introduced to the industry.

Large size apples are more difficult to prepackage, but this is not considered a permanent obstacle.

The main difficulty is the breakdown of the polyethylene film. It appears that some of the gases given off from apples cause chemical changes in polyethylene film so that if the fruit is held very long, particularly in its riper stages, the bag will first become cloudy on the inside, then sticky and

Mr. Carlsen says there will be a golden opportunity for the firm that learns how to overcome this difficulty.

#### STANFORD UNIVERSITY adds IE unit

INDUSTRIAL ENGINEERING took its place as the fourth major unit of Stanford's school of engineering September 1. Professor W. Grant Ireson. who has been chairman of the school's committee for industrial engineering studies, is executive head of the new unit.

Studies leading to bachelor of science and master of science degrees in industrial engineering are offered in recognition of a growing demand for men with this specialized training.

## ARMCO BUILDINGS FIT YOUR INDUSTRIAL NEEDS



Pump house in Ohio, 6' 8" wide by 8' long.



Plating plant in Pennsylvania, 28' wide by 72' long.



Multiple-span plant in Montana, total width 104' by 162' 8".

The wide range of sizes available with Armco Steel Buildings enables you to meet practically any industrial building requirement. Clear-span structures offer widths from 4 to 40 feet, and widths up to 200 feet or more are supplied by multiple-span buildings. Lengths are unlimited.

Armco Buildings are preferred for industry because they are: quickly available and easy to erect; economical yet attractive; durable in permanent installations yet permit dismantling and re-erection at new sites without loss of material.

Your Armco Buildings will need little or no maintenance. They are wind- and weather-tight. There's nothing to crack, warp or rot. And steel won't burn. Write for data.

#### ARMCO DRAINAGE & METAL PRODUCTS, INC.

CALCO DIVISION

2610 Seventh Street Berkeley 10, Calif.

6155 S. Malt Avenue Los Angeles 22, Calif.

#### ARMCO STEEL BUILDINGS



## A MODERNIZED ELECTRICAL SYSTEM LANDS IXL A BIG, NEW CONTRACT





• Electricity heats a new deep fat fryer tank and operates conveyor belts to speed production at the IXL Food Company's San Leandro, Calif., plant.

## Rewiring of San Leandro, Calif., plant leads to tripled production capacity

The IXL Food Company was about to land a big new contract for its San Leandro, Calif., plant recently. Production had to be stepped up to fill the orders the new contract would bring.

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The IXL Company found the solution quickly: The plant was rewired so there would be plenty of electric power for operating new machinery. The total cost of the rewiring was only \$10,000 and the company lost only four hours of production time due to the modernization. The new machines were installed,

production was tripled, and IXL landed that contract. Furthermore, there's now plenty of electrical capacity for future expansion.

IXL cans tamales, chili con carne and spaghetti. No matter what your company produces, you can probably make it better and cheaper with a modern electrical system. With a little planning you can provide for future expansion, too. Our engineers would welcome the opportunity to discuss the improvement of your plant electrical capacity.

P·GandE·

Pacific Gas and Electric Company

For free planned-wiring advice, call your P. G. and E. office today

#### EFFICIENCY KINKS

#### SOLAR FURNACES from searchlights



THERMODYNAMICS laboratory engineer aims Convair's new "searchlight" solar furnace.

THERMODYNAMIC engineers at Convair division, General Dynamics Corp., San Diego, have converted war surplus anti-aircraft searchlights into efficient solar furnaces. The converted searchlights augment Convair's 120-in. solar furnace, which has been used for a year in high temperature testing of metals, plastics, ceramics, and other materials.

Arc lighting mechanisms and glass covers were removed from the search-lights and a drill specimen holder was installed in each. Adjustment handles were attached so technicians could move the test sample into and out of the focal point.

#### Adapted to two uses

Two of the three searchlights purchased were converted into furnaces capable of producing temperatures of more than 7,000 deg. F. The other is being held intact to provide a source of heat energy about 60% as great as the sun radiates. This can be used when weather conditions blot out maximum sunlight.

The polished metal surfaces of the searchlight mirrors concentrate sun rays into a spot smaller than a dime. This intense heat melts most common metals in a matter of seconds and some specimens placed in the focal point are shattered by thermal shock.

## GRINDING DISKS reused

CLEANING aluminum oxide grinding disks when they become clogged with drawing compound is saving \$1,500 per year for Dura Steel Products Co., Los Angeles.

The disks, 10 in. in diameter, are used to deburr edges of medicine cabinets which Dura Steel manufactures at the rate of about 500 a day. The disks were previously discarded when they clogged up after the worker had completed 10 cabinets.

Realizing that the grinding disks are not worn out but simply clogged, Bob Seydoux, industrial engineer, suggested that the workmen drop them in a degreaser containing cleaning compound. Now, after cleaning, the disks are used to deburr six more cabinets each

#### **Contributions** wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, WESTERN INDUSTRY will be happy to award \$5.00. Please send in any details of how your plant solved some problems of design, production, maintenance, or process.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization, as well as adaptation of old tools and processes to do new jobs.

Send contributions to Efficiency Kinks Editor, WESTERN INDUSTRY, 609 Mission Street, San Francisco 5, Calif.

## DRYER ROLL damage eliminated

CHANGING of the felt used to carry wet pulp through the dryer section of a paper machine at one of the Weyerhaeuser Timber Co.'s pulp plants in the Pacific Northwest was speeded up and resultant damage to dry rolls eliminated by the installation of a metal

covered board between rolls recently.

Previously ends of felt strips were riveted together using the edge of a dryer roll as a place to clinch down the rivets. This often dented the roll and was a difficult place in which to clinch the rivets.

A metal covered board which extends between the rolls and provides a surface for tapping down the rivets prevents damage to rolls and speeds work.

#### MECHANIZED FRAME gives weld uniformity

WELD UNIFORMITY has been obtained in the process of building up roll shafts from the crushing plant of United States Smelting Refining and Mining Co.'s Midvale, Utah, plant. Master mechanic L. L. Shepherd designed a mechanized frame which rotates the shafts as they are being welded.

Previously, roll shafts were placed in a large lathe and turned intermittently by hand as the welder manually built up the roll. This method was slow and often caused warpage of the shaft from excessive heat.

In the new frame, the shaft rotates at the speed of ½ to 2 rpm. while a Lincoln submerged arc welder slowly traverses the length of the shaft, building up a weld of uniform thickness. When the shaft is completely built up, it is turned down to specifications on a lathe.



NEW MECHANIZED frame rotates roll shafts while welder rebuilds surfaces uniformly.



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## ...see CHASE'S newest movie!

16mm Sound and Full Color!

#### 24 minutes of exciting information for manufacturers of

- SCREW MACHINE PARTS
- WIRE PRODUCTS
- NON-FERROUS FORGINGS

"IN THE CHIPS" reveals how men and machines work together to give you easier-working, cost-reducing brass and other copper alloy rod and wire.

You see remarkable close-ups of modern screw machine operations—including incredibly fast and accurate turning, deep drilling, reaming and tapping. There are fantastic slow-motion sequences of almost-human machines that transform wire into finished products at lightning speed!

#### ARRANGE FOR A SHOWING!

Write on company letterhead to the Chase warehouse or sales office near you, or SEND THIS COUPON!

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WATERBURY 20, CONNECTICUT . SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

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DALLAS 7, TEXAS. 119 Pittsburgh St., Tel. PRespect 4271
HOUSTON 1, TEXAS. 16 Drannen St., Tel. CApital 7266
DENVER 16, COLO. 5101 Celorado Bivd., Tel. Dudley 8-2441

Waterbury	20, Conn. Dept. WI-955
Gentlemen:	
	e more information on your 16 mm, "In the Chips."
I would like to	arrange for a showing on or about
NAME	
NAME	
POSITION	
FIRM	*
ADDRESS	
CITY	STATE

To: Chase Brass & Copper Co., Incorporated

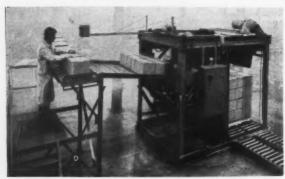
... for more details, circle No. 36 on Reader Service Postcard

## **NEW EQUIPMENT AND MATERIALS**

USE RIP-OUT POSTCARD, page 67, for more information on products described.

#### PALLETIZER

. . . fast, safe, and inexpensive



The Palletizer is a semi-automatic machine that makes pallet loading a fast, safe, and inexpensive operation. Patterns and loading rate may be changed as desired. A variety of pallet sizes can be handled by making simple mechanical adjustments. Size of package can be changed without adjustment as long as same size pallet is used. Loads desired and number of tiers is automatic, controlled by a pre-set, selector switch. J. W. Greer Co.

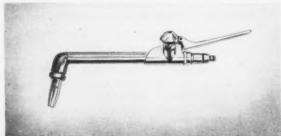
... For more details, circle No. 150 on postcard

#### STAINLESS STEEL ALLOYS . . . developed for corrosion resistance

Series of four new alloys offer variations in hardness and ductility for corrosive applications, PH55A, B, and C are claimed to equal or excel corrosion resistance of Type 316 stainless. The fourth, PH20, is distinguished by average Brinnell hardness of 229, as compared with 130 for standard 20 type alloy, Cooper Alloy Corp.

. . . For more details. circle No. 151 on postcard

#### CUTTING ATTACHMENT ... adapts blowpipe to intermittent cutting



Oxweld CW-45 cutting attachment connects to blowpipe handle (Oxweld W-45) in same way as a welding head, locked in place by a quarter turn of blowpipe coupling nut. It is capable of cutting steel 8 in. thick, operating on acetylene pressure of only 5 lb. psi. Recommended for intermittent cutting in contract welding shops, manufacturing plants, steel fabricating and maintenance shops. Linde Air Products Co., division of Union Carbide and Carbon.

. . . For more details, circle No. 152 on postcard

#### **ROTARY PUMPS**

. . . extend abilities with 50% pressure boost

New pressure rating of 150 psi. maximum pressure is offered by Worthington on its GA and GB rotary pumps, the result of improvements in metallurgy, surface finishes, and manufacturing techniques. Pumps will now have a wider range of applications in plastic, soap and cosmetic, chemical, paint, food, and other industries. Worthington Corp.

. . . For more details, circle No. 153 on postcard

#### HYDRAULIC HOSE ... for fire resistant fluids



Due to problems of interior swelling and breakdown of hydraulic hose with the use of fire resistant hydraulic fluids, a new hose is offered for the increasing use of these fluids. Aeroquip 1546 hose is available in several sizes, for medium-high pressure and high pressure uses. Aeroquip Corp.

. . . For more detals, circle No. 154 on postcard

#### POSITIONING CONTROL . . . gives sawmill automation

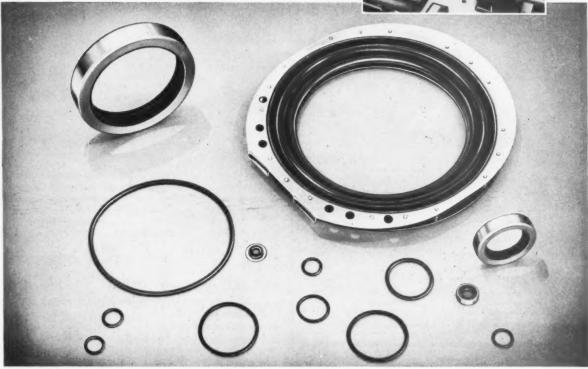


Electro-Set is an electronic position control for sawmills that selects and maintains thickness of sawed timber. Equipment provides remote control applications for sawmill carriages, edgers, resaws, and the like. Instead of mechanical brake and limit switches, a series of electrical holding circuits is used to control the log movement. To change thickness, the operator presses the appropriate button and the change is set automatically. Bend Iron Works.

. . . For more details, circle No. 155 on postcard

Winding a coiled spring is done on a small mandral by this machine. Later, the spring is cut to length and assembled on another machine which, like the one pictured, was designed by engineers of National Motor Bearing Company, Inc., Redwood City, California.





A sampling of the 5000 standard oil seals and springs manufactured by National is shown above. An integral part of many of these oil seals are close-wound helical springs—made from select USS Manufacturers Wire.

## Special wire assures "uniform tension" in oil seals

Among the different type oil seals made by National Motor Bearing is a revolutionary new one—part of a lubricating system designed to eliminate practically all hot boxes from railroad cars. An important part of this new seal (shown above, upper right) is a coiled spring. To achieve proper tension these springs must be formed from wire that has uniform tensile properties. Metallurgists at United States Steel tailor-made a wire to fit National Motor Bearing's particular requirements. The company's engineers report that the USS wire "completely fills our needs".

With the greatest wire-making facilities in the West, Columbia-Geneva can supply more than 1,000 types, grades and finishes of USS Manufacturers Wire. For information and technical assistance, write: Columbia-Geneva Steel Division, 1403 Russ Building, San Francisco 6, California.

Free Booklet!

WI-9

UNITED STATES STEEL CORPORATION COLUMBIA-GENEVA STEEL DIVISION 1403 RUSS BUILDING

SAN FRANCISCO 6, CALIFORNIA

Please send me your free, informative booklet that shows how USS Manufacturers Wire can be tailored to fit my needs.

Name\_\_\_

Address\_

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Wire that's tailored to fit your needs



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## **USS Manufacturers Wire**

UNITED STATES STEEL

... for more details, circle No. 39 on Reader Service Postcard





- ULTIMATE IN SIMPLICITY AND COMPACTNESS a straight line extension of a standard induction mater or available without mater.

  UNLIMITED SPEED RANGE from any desired maximum speed to zero, including reverse, without stopping motor.
- UNMATCHED ACCURACY of speed setting and re-setting and speed
- NO PERISHABLE PARTS such as belts or tubes, requiring periodic
- PROVED PERFORMANCE fifteen years satisfactory use as standard
- LOW COST a better job for less money.

#### W. H. DEL MAR COMPANY

3925 W. Slauson Ave. Los Angeles 43, AXminster 3-5301

4390 Piedmont Ave. Oakland 11, Olympic 3-2882

... for more details, circle No. 40 on Reader Service Postcard



#### TWO HEADS ARE BETTER THAN ONE



Sometimes a double head is the only solution to your part or fastener problem. This steel spacer is an excellent example of a single double-headed part that has replaced a more expensive 3 piece part. Not only was the spacer itself much less expensive but actual assembly cost was cut almost 30%. HASSALL doubleheading really paid off on this one.

Double-heading is only one example of the almost limitless possibilities Hassall cold-heading offers you. If you have a fastener problem just send us samples or specifications for a quotation.

WRITE FOR CATALOG . . . . with it we will send you our popular decimal equivalent wall chart. John Hassall, Inc., Box 2186 Westbury, L. I., N. Y.

SINCE



NAILS, RIVETS, SCREWS AND OTHER COLD-HEADED FASTENERS AND SPECIALTIES

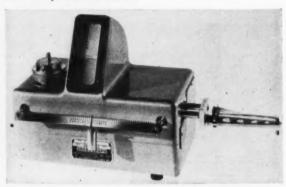
Los Angeles Representative:

C. W. Warren Co., 646 N. Fuller Avenue, Los Angeles 36, California ... for more details, circle No. 41 on Reader Service Postcard

#### **NEW EQUIPMENT**

. . . Begins on page 60

#### SHADOWGRAPH SCALE . . . no parallax errors



An entirely new concept in high speed, precision weighing and classifying is the new center tower Shadowgraph moment balance classification scale. Substitution of light projection indication for mechanical reading increases visible accuracy over 300%, manufacturer reports. It is also available in end tower dial design. The Exact Weight Scale Co.

. . . For more details, circle No. 156 on postcard

#### FIRE EXTINGUISHER TUBING

#### . . serves water, soda-acid, and foam types

New hose is now available to manufacturers and users of fire extinguishers, packaged in lengths cut to specifications at factory. Hose meets Underwriters' Laboratory Specifications of 400 psi. for five minutes. Weighs 14 lb. per 100 ft. Thermoid Co.

. . . For more details, circle No. 157 on postcard

#### **ENGINES**

#### . for lift trucks



Hi Duty lift trucks now have Waukesha engines equipped to use L-P gas and use catalytic exhaust. Catalytic systems combined with L-P gas eliminates carbon monoxide gas fumes entirely, making them safe for food processing plants. Both accessories are available for all seven Hi Duty models. Transitier Truck Co.

. . . For more details, circle No. 158 on postcard

#### HIGH VOLTAGE STARTERS

#### . . . with new fuses, contactors, and enclosures

New Westinghouse line of starters employs new 400amp. current limiting fuses for first time, as well as completely new air break contactors and new sheet steel enclosures 60 in. deep and narrower than previous designs. Starters have ratings of up to 1,500 hp. at 2,300 v. and 3,000 hp. at 5,000 v. for both induction and synchronous motors. Arc boxes are hinge-mounted for easy access. Mechanical interlocks provide greater personnel safety. Westinghouse Electric Corp.

... For more details, circle No. 159 on postcard

#### LIFT TRUCK ATTACHMENT . . . handles crated appliances

A pair of spring-applied clamps for handling crated appliances has been introduced as an attachment for lift trucks. Clamps enable the truck to stack crates with precision more than 20 ft. high. A side shifting mechanism moves the load 4 in. each way. Hydraulic pressure is used to adjust the clamps, while spring tension is used to hold the load gently, but firmly. Automatic Transportation Co.

. . . For more details, circle No. 160 on postcard

#### NAILS AND SCREWS . . . of a new design

Newly designed Ace drive screw and Ace fetter ring shank nails offer these features: uniformity and precision, high carbon steel, sharp points, smooth flat heads, clean threads and fetters, and smooth shank under head for machine nailing. Frank L. Robinson Co.

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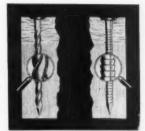
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. . . For more details, circle No. 161 on postcard

#### **AUTOMATIC PALLETIZER** . . . dial a pattern

Able to palletize cases of uniform size in interlocking patterns at the rate of up to 36 cases per minute, the Lock-Load automatic palletizer has regulation and selection of patterns on one-dial controls. A complete variety of pallet patterns are pre-set at the control panel in a matter of seconds. Utilizing a top-pallet-first feed eliminates manual filling of pallet magazine. The pallet is lowered after each layer, and when last layer is on, the complete interlocked load automatically moves out of the machine. Pamphlet illustrates the equipment. Food Machinery and Chemical Corp.

... For more details circle No. 162 on postcard

#### 2-WAY RADIO . . . from many sources



Compact is the word for the Model J Pak-Fone, a 2-way radio which operates from 6, 12, 24-v DC or 115-v AC sources without a separate power supply. Unit measures only 10 x 9 x 5 in., can be quickly mounted in any position, and transferred in two minutes. Loudspeaker and power supply are built in. Microphone, antenna, and mounting frame are standard equipment. Frequency modulation and a relay type squelch circuit provide clear, noisefree communications. Industrial Radio Corp.

. . . For more details, circle No. 163 on postcard





Attention Purchasing Agents:
We make this startling offet to introduce your company to Evans' superior King-Size and Pocket White-Tapes, the finest measuring tapes manufactured.

Simply fill in the coupon below and we'll send you, absolutely free and without any obligation, your choice of either our King-Size 10-ft. (\$2.39 retail) or Pocket 12-ft. White-Tape (\$1.89 retail)! (Offer limited to one tape per purchasing agent.)

We feel that once you try Evans Tapes, you'll never buy another brand. Here's why:

#### **EVANS KING-SIZE**

10-ft. ¾" Wide Steel Tape Stands Up Straight for Easy One-Man Measurements.

The 33% wider blade (full ¾") stays straight up-will not bend when making measurements. Chrome plated zinc die-cast case. Free belt clip for handy carrying and Free Tenite Utility Case. Self-adjusting sliding hook for accurate inside-outside measuring. Also available in 6, 8, 12-ft. lengths.

All EVANS Tapes are marked so your men don't have to figure! Work in feet and inches? Read Here

#### **EVANS 12-ft. Pocket WHITE-TAPE**



Measures a full 12 feet — eliminates adding two measurements as with shorter tapes. Regular ½" wide blade. Chrome plated zinc die-cast case. Self-adjusting sliding hook for 100% accurate inside or outside measurements. Free transparent Tenite Utility Case.

Also available in 6, 8, and 10-ft. lengths.

#### Evans RULE CO., Department 160 400 Trumbull Street, Elizabeth, N. J.

Please send me free sample of (check one) King-Size 10-ft. Steel Tape Pocket 12-ft. White-Tape My two sources of supply for steel tapes are:

Title\_ Name\_ Company\_ Address... State City\_ Zone

... for more details, circle No. 42 on Reader Service Postcard



at the Right point with a

#### POWERS

No. 11

#### Self-Operating REGULATOR

Simplest, Reliable Central made for water heaters, industrial processes, heat exangers, air compressors.

#### BETTER CONTROL FEATURES

Powers bellows has 50% more power than used in majority of regulators. Durable 2-ply bellows outlast ordi-

nary single-ply type. Valve stem lubricator with silicone grease aids easy movement of highly polished stainless steel valve stem and reduces drying out of packing.

Better control results from Powers powerful bellows and minimum of valve stem friction. Write for Bulletin 329.



#### THE POWERS REGULATOR CO.

Skokie, III., . Offices in 60 Cities . See Your Phone Book

Over 60 Years of Automatic Temperature and Humidity Control

... for more details, circle No. 43 on Reader Service Postcard

#### *URETY* SURESEAL TRIAL GLOVES



"The gloves withstood the mixed acid test for the three-minute minimum ... went on for hours with no apparent effect," reports one Sureseal user.

The same extra-high resistance to practically all industrial chemicals plus Sureseal's 4 times greater snag resistance and 10 times greater abra-sion resistance mean multiplied service life . . . big cost savings on most jobs. For all the facts, write for new Sure seal bulletin.

TURN-CUFFS **GIVE 2 WAY PROTECTION** 

Cuffs up . . . liquids can't run down arms or inside gloves. Cuffs down . . . they provide an extra-long protective gauntlet.

WESTERN DIVISION, Dept. A, 544 Market St., San Francisco 4, California

... for more details circle No. 44 on Reader Service Postcard

#### . . . can climb stairs

**NEW EQUIPMENT** 



New wet-dry industrial vacuum cleaner is equipped with large non-marking rubber wheels and handle bar for carry which enables machine to glide over carpet edges and sills and climb ramps and stairs without lifting. The machine motor has safety by-pass for water and detergents, and recovery capacity is 12 gal., or 1½ bushels of dirt. West Disinfecting Co.

... For more details, circle No. 164 on postcard

#### POLY-V DRIVE

#### . combines multiple and single belts



New Browning Poly-V drives consist of multiple V-belts moulded as a single unit running on matching sheaves. This combines the advantages of V-belts with the simplicity of flat belts, eliminates belt matching problems, provides space saving drive with narrower sheaves, shorter centers, higher capacity and all

members in match for constant and continuous uniform pull across full belts and sheave width. Bulletin 2098 gives full details. Browning Manufacturing Co.

. . . For more details, circle No. 165 on postcard

#### ENGINE HOUR METER

#### . . . now standard on Towmotor lift trucks

Guesswork in scheduling maintenance and computing fuel costs is eliminated with use of Hobbs engine hour meter, now installed on all Towmotor fork lift trucks and tractors. Instrument, which operates only when ignition switch is on, records a total of 10,000 hours of engine operation and then automatically starts over again. Towmotor

. . . For more details, circle No. 166 on postcard



3630 Eastham Dr., Culver City, Calif. TExas 0-4910 . VErmont 8-3460 ... for more details circle No. 45 on Reader Service Postcard

#### COUPLING LINK . for alloy chain users



Enabling alloy chain users to make up their own sling and special assemblies, a new coupling link eliminates the time required for ordering and shipping new or repaired assemblies from the factory. The Hammerlok link consists of a pair of body halves, a tubular stud, and a hardened alloy steel pin. Once assembled, it is securely locked by the steel pin which bites into

the steel stud. No peening or welding is required and the link can be disassembled and re-used. Columbus McKinnon Chain Corp.

. . . For more details, circle No. 167 on postcard

#### **FAN COOLED MOTORS** . . . for use in clogged air



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Century Electric Co. announces new re-rated totally enclosed fan cooled motor line in the  $7\frac{1}{2}$  to 100-hp. series. Features include six layer insulation with plastics, ventilating fan providing same efficiency of cooling when operated in either direction, rib type cast iron frame construction, and electronic balancing of rotor. Century Electric Co.

. . . For more details, circle No. 168 on postcard

#### TUBE AND BAR PRINTER . . . for clear marking on wide range diameters

Automatic printer for ferrous and non-ferrous tubes and bars can be operated either in a moving production line or can be motorized for separate military requirements. One adjustment permits printing on various diameters, and relatively large size characters can be printed on small diameter surfaces. Simple construction makes it easy to operate and maintain. Jas. H. Matthews & Co.

. . . For more details, circle No. 169 on postcard

#### PORTABLE HEATER . burns either oil or gasoline



A new "Thrifty" model portable heater makes its appearance under the Herman Nelson trade name. Modern design and production techniques are combined to make available an indirect-fired air heater in the low price field. The new heater is fired with ordinary fuel oils, but can burn gasoline just as efficiently when necessary. Heating capac-

ity is manually controlled from 50,000 to 170,000 Btu. per hour. Heater may be used indoors and out, with combustion gases vented outdoors whenever required. Herman Nelson Division of American Air Filter Co.

. . . For more details, circle No. 170 on postcard

saves up to 75%... unmachinable alloys. Applications are virtually unlimited. Write for free literature describing the investment casting process.



## **Arwood investment casting** even on complicated shapes

The Arwood investment casting process permits great design freedom. Many former sub-assembly jobs are now being designed as single-unit castings, with complicated parts being cast in

Our engineers will be pleased to go over your parts problems with you and help cut your own costs. Why not submit parts or prints to us for quotations? Consultation is free of obligation, of course.

#### CASE STUDY

**DESIGNATION:** Female Hinge

METAL USED: Stainless Steel (AISI 302)

QUALITY CONTROL: Chemical and physical affidavits furnished. Test Bars submitted. Produced with  $100\,\%$  X-Ray requirements.

PARTS: Designed and cast as single unit. Formerly composed of three units welded together.

ADVANTAGES: Strengthened with re-inforcing ribs in U-Bracket. Weight decreased without decrease in strength. Reaming holes only machining required. Formerly holes countersunk outer sides only, now cast with radii on both inner and outer sides. Greatly reduced cost.

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... for more details, circle No. 46 on Reader Service Postcard

## Cool, Safe on the HOTTEST, TOUGHEST Cutting jobs...

## Vicion

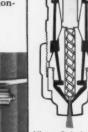
#### **CUTTING TORCHES**

With stainless steel head and tube assemblies.

Time-tested spiral mixers

NOW all Victor torches and cutting attachments have rugged, stainless steel head and tube assemblies, plus time-tested spiral mixers to give you cool, safe cutting on your toughest, hottest cutting jobs. Stainless steel assembly absorbs heat slowly, withstands roughest use, is easier to maintain. Famous Victor spiral gas mixer prevents flashback and back fire, thoroughly mixes gases to make your gas dollars go further. Head and tube assembly is one unit, and can be replaced without buying a complete torch.

Test the Victor cutting torch on your most demanding, severest cutting job. See for yourself how cool it stays, how fast it cuts. Your Victor dealer will gladly demonstrate it. See him today.



Victor Spiral Mixer and Gas Proportioner



Cutting attachment, and cut-away of a typical Victor tip, showing carefully proportioned orifices. For best results, always use Victor tips with Victor torches.

#### -VICIOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

844 Folsom St. San Francisco 7 3821 Santa Fe Avenue Los Angeles 58

San Francisco 7 Los Angeles 58
. . for more details, circle No 47 on Reader Service Postcard

#### GRIPHOIST

#### . . impossible for cable to slip



Portable and manually operated, the Tirfor Griphoist is rated at 3,300 lb. at 10 fpm. cable travel, and able to handle 6 tons or more by rigging with pulley blocks. A crank and lever mechanism actuates two pairs of forged steel jaws which alternately grip and pull the cable. The jaws are grooved to the radius of the cable and are absolutely smooth. The heavier the load, the tighter the grip. Machine uses a 1/2-in. wire rope. Griphoist, Inc.

... For more details, circle No. 171 on postcard

#### PUMP

#### . . . handles toughest corrosives

New plastic-body pump has non-corrosive, non-contaminating qualities which solve industrial pumping problems, from corrosive liquids to delicate foodstuffs. Precision molded flexible liner, made from variety of materials, each with resistance to particular product handled, is chief feature of pump. One of these materials is Hycar American rubber, manufactured by B. F. Goodrich Chemical Co. Plastic-body pump has no stuffing boxes, shaft seals, check valves, glands, or gaskets. Vanton Pump and Equipment Corp., division of Cooper Alloy Corp.

... For more details, circle No. 172 on postcard

### ALUMINUM ALLOY ... meets need for high-strength conductor

Revere Alloy 6263, the result of joint research by Revere Copper and Brass Inc. and Aluminum Co. of Canada, is a new high strength aluminum alloy for electrical applications, particularly busways. Mechanical properties are said to approach those of copper, with electrical conductivity approaching that of EC grade aluminum. Revere Copper and Brass Inc.

. . . For more details, circle No. 173 on postcard

#### LIFT TRUCK CONTROL . . . is simplified combination



Lamson Mobilift announces its new simplified combination lever control which operates the fork hoist and mast tilt on its 4,000-lb. model D-424, and 3,000-lb. model M-324 lift truck. The lever operates in an H pattern, the left side operating the hoist, the right side the mast tilt. This dual-purpose control reduces truck controls to four levers and two pedals. Lamson Mobilift Corp.

. . . For more details, circle No. 174 on postcard

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## WHAT'S YOUR PROBLEM TODAY?

Make use of Western Industry's special service for readers. These basiness reply cards provide a quick, easy way to obtain full details on products and services described or advertised in this issue.

In addition, Western Industry will provide you with special help in locating sources of information concerning unusual plant operational problems you may have. Write and describe your problem briefly. Western Industry is particularly equipped to help you in the fields of:

Power transmission Materials handling Plant electrical installations Fluid and air handling and control Power and hand tools Plant building materials and service equipment

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Industrial packaging
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Welding
Plant safety
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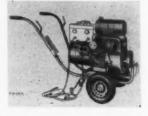




#### GENERATING PLANT

#### . . . for welders or emergency power

Combining the new aircooled Onan model 205AJ-IM, 2,500-watt, 115-v, 60cycle, AC electric generating plant with any 150 amp. transformer type welder, provides a portable source of AC power. A 3-pole receptacle is provided for quick plug-in of any trans-



former type AC welder. The unit is powered by a singlecylinder, 4-cycle, air-cooled gasoline engine. D. W. Onan & Sons. Inc.

. . . For more details, circle No. 175 on postcard.

## TOOL CASING

Hy-Speed Casing, a protective coating treatment for tools, is a special service now being offered by Cook. According to the company, this process, for tools after they have been hardened, tempered, and finished ground, produces these results: increased surface hardness, increased wear resistance, keener cutting edge, less time for tool setting and grinding, increased production, and correction of soft skin due to faulty hardening. Cook Heat Treating, Inc.

... For more details, circle No. 176 on postcord.

## AGGLOMERATED FLUXES ... to weld low alloy steels

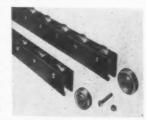
Adding alloys to the weld deposit through the flux rather than through the wire is possible with the new line of agglomerated fluxes for automatic submerged arc welding of low alloy steels. Fluxes available can be compounded to produce weld metal containing chromium, molybdenum, vanadium, and nickel in varying amounts. Agglomeration process of manufacturing permits precise control of flux analysis and the compounding of fluxes to meet weld deposit requirements. Lincoln Electric Co.

. . . For more details, circle No. 177 on postcard.

#### CONVEYOR

#### . . . resists bending under load

This new type lightweight gravity wheel strip conveyor, called the Rapistan Flow Track comes in two standard sizes, each with a choice of three wheel spacings. Method of wheel mounting gives two-point axle support that provides resistance to bending under



loads. A standard 10-ft. section, with supports on 5-ft. centers, has a distributed load capacity of from 400 to 750 lb., yet weighs only 15 to 24 lb. Rapids-Standard Co., Inc. . . . . For more details, circle No. 178 on postcard.

## Now...a revolutionary, new telephone for your office

It lets you talk without lifting the receiver



Heard about the new hands-free Speakerphone? Well, it's something right out of the future. With one on your desk, you can make calls, or answer them, without ever lifting the receiver. This ultramodern phone has a "mike" in the base and a loudspeaker attached. You just press a button to use it. Your hands are free to take notes, leaf through papers, or light up a cigarette. And telephone conferences are easy with a handsfree phone. Several people can gather 'round it, and each can hear and be heard clearly. Or, for more privacy, use this set like a regular phone. Truly, it's the answer to a businessman's needs.

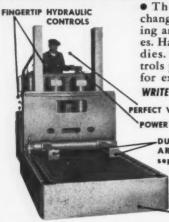
You can have a Speakerphone installed now. Just call our business office. We'll be glad to tell you anything else you want to know about it.



**Pacific Telephone** 







• The fastest way to change dies on stamping and forging presses. Handles 5 to 50 ton dies. Hydraulic controls permit "Inching" for exact die spotting.

WRITE FOR NEW BULLETIN

PERFECT VISION

DUAL PUSHER
ARMS...operate
separately (For
pulling, cables are
attached to die
and eyes on
arms.)

LOWER PLATFORM

... for more details, circle No. 50 on Reader Service Postcard

WHICH JOB
WOULD YOU LIKE
TO IMPROVE?



Listed below are some of the jobs discussed in Oakite's 44-page illustrated booklet on Metal Cleaning. Let us help you do them with better results, greater economy.

economy.	
Tell me about Oaki  Tank cleanin  Machine clean  Electrocleanin  Pickling	Zinc phosphate coating Paint stripping Paint stripping
COMPANY	
ADDRESS  Sechnical Service Represent	

... for more details, circle No. 51 on Reader Service Postcard

MAPERIALS . METHODS . SERVICE

#### FRICTION CLUTCH

#### . . . for power transmission

Using the dependable "over the center" toggle mechanism in its design, this new friction clutch is offered for applications where increased speeds prohibit use of jaw clutches and where smooth, gradual pick-up is a requisite. It assures positive positioning and minimizes the possibility of accidental engagements or disengagements. Large friction areas give higher torque capacity in relation to size. Heat dissipation is high. A split friction plate



permits inspection without removing the clutch from the shaft. Company provides Book 2637 with full specifications. Link-Belt Co.

. . . For more details, circle No. 179 on postcard.

## TRACTOR SHOVEL ... with dust protection

Added to the Michigan line of rubber-tired tractor shovels is a new 15-cu. ft. capacity shovel with dust protection features. Designated the 12B, new machine features a power-shift transmission, a torque converter, planetary wheel axle, and low level bucket action. A filter for the torque converter oil is provided and a partial flow filter protects engine lube oil. Transmission, torque converter, start-



ing motor, distributor, and generator are all sealed. Available with either gas or diesel engine, the Model 12B has a 1,500-lb. travel capacity. Clark Equipment Co.

. . . For more details, circle No. 180 on postcard.

#### CATALOGS TO YOUR SPECIFICATIONS



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INDIVIDUALIZED
by your trademark,
colors—plain or
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quality work obtainable.

 You can dramatize your sales messages with prestige and appeal. Ask for a salesman to show you samples of what ather companies are doing. No obligation, of course.

BINDER PRODUCTS
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... for more details, circle No. 52 on Reader Service Postcard

#### VAPOR DEGREASERS

#### . . . for larger parts and heavier loads

Baronet barrel degreaser line is expanded to include two rectangular-shaped vapor spray degreasers for larger sized parts and heavier work loads. Machines are fabricated of 12-gage, 3/16-in. plate and protected against corrosion with a fused phenolic interior coating. Available in two sizes, the new degreasers have un-



obstructed working dimension 36 or 48 in. long, 18 in. wide, and 24 in. vapor depth. Baron Industries.

. . . For more details, circle No. 181 on postcard.

#### **PALLET DOLLIES**

as

#### . . . of lightweight magnesium

Completely re-designed line of magnesium pallet dollies feature extruded magnesium frames, hardened steel axles, and phenolic resin rollers with factory-lubricated sealed bearings. Tilt construction, rounded-side rollers, and heavy-duty roller bearings assure easy manual movement and 360 deg. turning, according to the manufacturer. Although the new pallet dollies are available in capacities to 4,000 lb. the average model weighs only 37 lb. Magnesium Company of America.

. . . For more details, circle No. 182 on postcard.



## for Sales, for Planning, for Publicity!

Alert executives everywhere are finding precise aerial photos invaluable for use in intelligent planning for expansion or revision, for use in sales portfolios and meetings, as murals in offices, and for advertising.

Isn't it time for new "portraits" of YOUR plant?

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#### September 1955 — WESTERN INDUSTRY

## "ALL-KENNETT" TRAY SYSTEM PAYS OFF IN FAST, ACCURATE, LOW COST ORDER FILLING



Simultaneous filling and checking of orders. In this manuof orders. In this manufacturer's order department, specially designed Kennett Trays ride "pickaback" on larger ones flowing along conveyors. As one clariones nowing along conveyors. As one clerk places ordered items in small trays, the next clerk checks them and transfers them to larger receptacles. No delay, no errors—each order is checked as it is filled!

Kennett Receptacles—ideal for materials handling. Jostling along conveyors, whiz-zing down chutes, Kenzing down chutes, Kennett Receptacles take slam-bang treatment without breaking, cracking or denting. Protect fragile materials and packages, too! For Kennett Receptacles are made of National Vulcanized Fibre-tough, resilient, good for years of punishing service.

Joh-designed to suit your special re-quirements. Compact, light-weight Kennett Receptacles nest snugly, stack easily for handy storage and quick transporta-tion. Even women em-ployees find them easy to handle. For special jobs, we'll design them to suit your specific needs—and supply them to you at amaz-ingly low cost.



You can order Kennett Receptacles in a wide variety of sizes, shapes and designs. Your nearby Fibre Specialty Materials-Handling Specialist will be glad to recommend the system to fit your needs. Be sure to ask for his name and phone number when you send for your free copy of our new Catalog W-I.



... for more details, circle No. 54 on Reader Service Postcard

## HELPFUL LITERATURE

#### FOR THE WESTERN PLANT OPERATOR who wants to keep informed.

Speed changers

Complete line of "Vari-pitch" speed changers which are available in 12 sizes ranging from 1 to 75 hp. with output speeds ranging up to 2,900 rpm., is described in new bulletin. Arrangement diagrams, selection tables, and a speed range table are included. Allis-Chalmers Mfg. Co. 20B6013D

. . . For your copy circle No. 183

Steel publications

Allegheny Ludlum's 5th edition of its complete publication list is contained in a 16-page, pocket-sized booklet. It lists 85 current technical data sheets and booklets on stainless, electrical, tool and die steels, and other high alloy specialties. Allegheny Ludlum Steel Corp.

... For your copy circle No. 184

Form-fit power transformers

Twenty pages of information on the features, applications, and design of Westinghouse Form-Fit transformers is now available. How the units are designed to meet mechanical, thermal, and dielectric requirements is covered in detail and a 7-page section permits the reader to cutaway a complete transformer in successive steps. Westinghouse Electric Corp. B-6524

. . . for your copy circle No. 185

Hydraulic lift

Four-page folder shows three basic models of Hy-Sky lifts and their utility in industrial plants. Photographs and text point out operating features. Hy-Sky Lift Co.

. . . for your copy circle No. 186

Portable hoist or puller

Tirfor, a portable unit using wire rope in place of chain, is described for uses in industry, construction, utilities, transportation, and many other fields in a new bulletin. Full specifications of this one-man operated unit and instructions pertaining to how the unit's power can be increased for extra-heavy loads are included. Griphoist, Inc.

. . . For your copy circle No. 187

#### Arc welding equipment



Aircomatic welding equipment has the spotlight in an illustrated 16-page catalog (No. 2350). Manual and automatic units for this inert-gas-shielded metal arc welding process are shown, as well as accessories and welding wire. Air Reduction Pacific Co.

. . . For your copy circle No. 188

Machine pads

What is Air-Loc 4-17-4? The answer is in this booklet-which tells why Bakelite vinyl, sisal, and granulated cork were chosen as ingredients for this new vibration dampening material; how its design brings about easy installation and new freedom in shifting machinery; how it can mean installation costs one-half those of ordinary insulation pads. Clark-Cutler-McDermott Co.

... For your copy circle No. 189

Variable speed drive

New bulletin K-200 scrutinizes Cleveland speed variator line of Type K drives-now supplemented by addition of nine Type KL models for constant torque applications. Operating characteristics are pointed out by graphs and diagrams. Cleveland Worm and Gear Co.

. . For your copy circle No. 190

Flat steel strapping equipment

Line of heavy-duty flat steel strapping equipment and accessory items is illustrated in a new 8-page bulletin. Stretchers, sealers, dispensers, cutters, plates, nails, staples, and other items for use in carloading, truck-loading, palletizing, and unit reinforcement are covered. Gerrard Steel Strapping Division, United States Steel Corp.

. . . Fer your copy circle No. 191

#### Industrial V-belts

Bulletin lists Durkee-Atwood multiple V belts and general duty V belts, giving dimensions, weight, and list price. Durkee-Atwood Co.

. . . For your copy circle No. 192

Have You a LUBRICATION HEADACHE? Solve it Quickly With



ANTI-FRICTION COMPOUND (IN WHITE POWDERED FORM)

Motor Mica can put an end to your lubrication problems. Try it with your cutting oils, in discasting, deep-drawing, metal stamping, etc. Works wonders in screw machine, punch-press and other operations. Cools Hot Bearings. Write on your business letterhead for free sample.

Keeping the Wheels of Industry Cool Since 1914

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SULPHURIC ACID for the west 66° BAUME and special grades SALT LAKE CITY, UTAH

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#### M-H system

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Forty-eight page Catalog 352 gives a complete rundown on the Brooks Load Lugger system—made up of a hydraulic hoist, which can be installed on any standard truck chassis, and a wide variety of Brooks bodies, interchangeable, for handling or dumping all kinds of materials. Drawings, photographs, and tables cover operating features and applications of all models. Brooks Equipment & Mfg. Co.

. . . For your copy circle No. 193

#### Cylinders and valves

Here is a general catalog covering company's fluid power devices: cylinders, valves, and packaged units. Catalog is in loose-leaf form, with over 100 pages of detailed information on company products. *Modernair Corp.* 

. . . For your copy circle No. 194

#### Machining aluminum

New 52-page pocket-size manual gives technical data and tooling information on production of aluminum parts using automatic screw machines. Machining speeds and feeds and cutting fluids are tabulated for various types of machines. Drawings show proper tool angles. Also included in this how-to-do-it guide are general formulas useful to screw machine operators and a nomograph for determining number of parts obtainable from given size of aluminum stock. Kaiser Aluminum & Chemical Sales, Inc.

. . . For your copy circle No. 195

#### Floor safety

Floor maintenance materials engineered for safety are the content of this 16-page booklet, covering floor polishes, anti-slip products, damp sweep products, and other maintenance items. Included is an offer to provide consultation services of a Legge safety engineer on any floor problem. Walter G. Legge Co., Inc.

. . . For your copy circle No. 196

#### **Cooling towers**

This folder provides a "close-up" of the Lo Line, a low-silhouette cooling tower for air conditioning, with 75 ton capacity and up. Text covers construction features, illustrated by photographs and cross-section diagram. J. F. Pritchard & Co.

. . . For your copy circle No. 197

#### Copper and aluminum wire

First two sections of Anaconda Wire and Cable Co.'s catalog are now available in revised form, brought up to date with recent changes in ASTM specifications for copper and aluminum and new ACSR constructions. Section 1 covers "Bare and Coated Wire and Cable," and Section 2, "Weatherproof Wire and Cable." Tenpage section on overhead line accessories is incorporated in Section 2 for the first time. Anaconda Wire and Cable Co.

. . . For your copy circle No. 198

#### **Rolling bearings**

New SCM line of ball bearing pillow blocks and flange cartridge mounts is featured in this 52-page bulletin (No. A-638), which also gives up-to-date technical information and list prices on complete line of Dodge SC ball and Dodge-Timken roller bearings. Data includes engineering drawings, dimensions, shaft sizes, weights, and radial load ratings. Product illustrations include cutaway views and installation photographs. Dodge Manufacturing Corp.

. . . For your copy circle No. 199





YUBABILT BULL GEARS with 12" face and outside diameter of 146", for main drive gears on bucket line of bucket ladder dredge. Welded construction saved cost of new patterns.



YUBA-SCHROCK MOTORIZED HEAD PULLEY has motor mounted internally, eliminates all external gears, sprockets, chains, saves space, operates safely under wet, dusty, gritty conditions. ½ to 125 hp.



STOCKTON-YUBABILT TINE FORK for handling kelp, steel shavings, etc., has same powerful closing action as Yubabilt Power Arm Clamshell.

For special equipment, designed and built to your order, consult YUBA.



YUBA MANUFACTURING CO.
om 659 351 California St. Son Francisco 4, Calif.

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... for more details, circle No. 58

#### HELPFUL LITERATURE

Straddle dump carrier

New brochure lists the characteristics, construction details, and engineering specifications of Clark's new hydraulically operated dumping device. The new carrier can pick up box-like containers for gravel, scrap, coal, sand, and other bulk materials, transport them any distance, and dump them in a one-man operation. Clark Equipment Co. 81

. . . For your copy circle No. 200

## Union labor in California

Here is an official report on union membership in California, by industry and area, and an analysis of provisions in California union agreements covering paid vacations, paid sick leave, paid holidays, premium pay for holiday work, and scheduled hours of work. 37 pages. State of California, Department of Industrial Relations.

. . . For your copy circle No. 201

## Electric heat for process machines

Regan electric heating units are on display in this 12-page catalog, made up of several bulletins published by company. Some of these are: cartridge, strip heater, and tubular elements; band heaters; thermostats and resistors. Engineering drawings and price lists accompany catalog. Regan Engineering Corp.

. . . For your copy circle No. 202

#### Industrial research lab

This brochure gives some idea of the services to industry contributed by a Los Angeles commercial laboratory which has carried out research and experimental studies in fields as varied as electrodeposition and air pollution. Truesdail Laboratories, Inc.

. . . For your copy circle No. 203

#### Steels for mining

Five specialty steels used in mining, quarrying, and finishing stone are reviewed in this 20-page pamphlet, with information on forging and heat treating of these steels. Text and pictures show how to make the best use of hollow and auger drill steels, solid drill steel, broaching and channeller steels, and stone-dressing steels. Bethlehem Pacific Coast Steel Corp.

. . . For your copy circle No. 204

#### Spray painting equipment

Complete spray painting outfits are cataloged in this booklet. Guides show the correct gun and nozzle combinations to use with all types of commercial materials. It is arranged to give maximum information to guide maintenance painters in buying and using equipment. The DeVilbiss Co.

... For your copy circle No. 205

#### Sealed casters

Catalog SC-55 presents two Bassick swivel caster series with sealed construction—giving specifications and recommending applications. Diagrams and text set forth clearly the advantages of sealed bearings in both casters and wheels. Bassick Co.

. . . For your copy circle No. 206

#### Hydraulic keyseater

Bulletin 34 is a 4-page introduction to a newly redesigned keyseating machine which has patented hydraulic action for accurate internal keyway cutting in a wide range of sizes. Dimensions and specifications are given, as well as special attachments for cutting internal splines. E. W. Bliss Co.

. . . For your copy circle No. 207

#### Midget solenoid valve

Here is a new technical bulletin (Form V5001) on company's two-way midget solenoid valve, Bulletin 8262, giving: (1) new port and pipe sizes; (2) new pressure ratings for normally open valves; (3) new U. L. approval and listing for explosion-proof service. Automatic Switch Co.

. . . For your copy circle No. 208

#### Core sand binders

Advantages of using Hercules Powder's Truline binders are pictorially described in a new 12-page booklet. Photographs of various operations in foundries show how the binders eliminate oven bottlenecks in the core room, reduce sand cost, resist moisture pickup in the mold, provide greater core strength, and permit easier core removal. Hercules Powder Co. 400-523

. . . Fer your copy circle No. 209

#### Heavy duty lifting

Ideas and suggestions for solving in numerable lifting problems are coupled with catalog information on heavy-duty oil-hydraulic lifting devices in this new 20-page book. Installation photos, engineering data, and recommendations for use of the equipment and accessories described are included. Rotary Lift Co. RE-203

... For your copy circle No. 210

#### Make your own tubing from aluminum strip

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How users can manufacture their own aluminum tubing from strip is detailed in a new Revnolds "technical advisor" booklet. The new method handles diameters from 1/2 to 21/4 in. and wall thicknesses from 0.020 to 0.083 in. A question and answer section gives data on reflector sheet and alloy R301, tells how to prevent gassing, presents formulas for cold solder and aluminum caulking compound, describes a new aluminum isotope for radioactive tracing work and a new rust-inhibitive aluminum paint, and gives many other suggested aluminum applications. Reynolds Metals Co. 29

. . . For your copy circle No. 211

#### Air conditioning units

New 20-page catalog describes American Blower's new line of central-station, cabinet-type air conditioning units. Ten pages are devoted to tables and graphs that enable heating and ventilating engineers and contractors to determine the exact type of unit which will meet their needs. American Blower Corp. 8127

. . . For your copy circle No. 212

#### Pillow blocks

Catalog 112 covers sleeve bearing pillow blocks. Each series manufactured by company is described, with drawings and tabular data. In addition, recommendations on installation and maintenance are given. Randall Graphite Bearings, Inc.

. . . For your copy circle No. 213

#### Speed reducers

Forty pages on Line-O-Power drives are offered in Engineering Manual LP 3, covering service factors and load characteristics, ratings, dimensions, ratios, and other selection guides. Foote Bros. Gear and Machine Corp. . . . For your copy circle No. 214

#### Hand cleaning lotion

Four-page colored folder tells the story on Ever-Kleen industrial cleaning lotion for hands, skin, and hair: from its safety advantages to the economies it brings about by making possible on-the-job cleanup. Ever-Kleen Products, Inc.

. . . For your copy circle No. 215

#### Special conveyor belts

New data sheet on special belt constructions describes new "riffle grip" conveyor for wet materials, which can separate or retain, as desired, water content during travel. Another special belt, for foundry service, has wireinsert design to prevent accidental rips from running whole length of belt. Others are described as well. B. F. Goodrich Co.

... For your copy circle No. 216

#### **Electric plants**

Standard and optional features of Ready-Power self-contained electric generating plants are covered in this 12-page bulletin. Other information includes types of generator controls available from this manufacturer, and application photographs. Ready-Power Co.

. . . For your copy circle No. 217

#### Roller chains

Four-page folder tells the story of a new self-lubricating roller chainhow it functions, where it can be used, how long it stands up under wear and impact tests, and some case histories on applications. Whitney Chain Co.

. . . For your copy circle No. 218

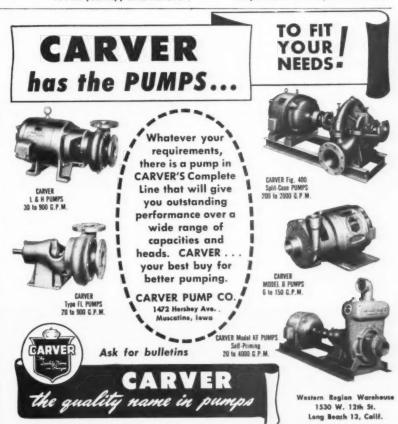


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Cleveland Air-Cushioned Vibrators are moving and settling a wide variety of concrete products in bins, hoppers, chutes and screens. They're doing it efficiently, they're doing it every day and they're doing it QUIETLY.

Catalog No. 108 will give you further details.



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... for more details, circle No. 61

#### HELPFUL LITERATURE

## Handling and processing equipment

Some of the products and facilities of Jeffrey Manufacturing Co. are listed and pictured in this pocket-size booklet. Company builds machinery for a wide variety of industries—among them, power stations, steel mills, pulp and paper mills, lumber and wood products, chemical plants, food and canning plants, stone products mills, and mining operations. A few hundred of the products—from chains to magnetic separators—are listed and pictured in these pages. Jeffrey Mfg. Co.

. . . For your copy circle No. 219

#### Cooling tower standards

Three reports are now available from Cooling Tower Institute, growing out of a five-year research program. Bulletin ATP-105, "CTI Acceptance Test Procedure," gives basic method for testing water-cooling capability of any industrial tower. Bulletin STD-101, "CTI Grades of Redwood Lumber," recommends special grades for use in industrial towers. Bulletin STD-102, "Structural Design Data," describes design stress allowables. Cooling Tower Institute.

. . . For your copy circle No. 220

#### Stainless weld metals

New data card gives stress-rupture properties of chromium-nickel stain-less steel weld deposits. Presented in tabular form, this information is particularly valuable for engineers working with problems of design and use of stainless tubular products, where welding is employed as a form of joining lengths, connecting fittings, attaching clamps and hangers, or anchoring against tube sheet or header. Data card, TDC-178, summarizes properties to be expected in a number of stainless weld metals. Babcock & Wilcox.

. . . For your copy circle No. 221

#### LP-gas fuel

Operation and engineering of LPgas fuel systems in lift trucks and tractors is reported in this folder from Towmotor, which now offers LP-gas power on all models but one. *Tow*motor Corp.

. . . For your copy circle No. 222

#### **Engineered drives**

Reliance motors, drives, and electronic controls for Federal and Marine service are described in new 12-page booklet, "Sky High to Ocean Blue." Photographs of equipment and applications show planning and development that goes into engineered drive systems. Reliance Electric and Engineering Co.

. . . For your copy circle No. 223

#### Vibration analyzer

Folder gives specifications and operating information on this balancing and analytical instrument, Model 400 IRD vibration analyzer, recommended for use in industry from the small machine shop to the large plant. International Research and Development Corp.

. . . For your copy circle No. 224

#### Split roller bearings

An 18-page catalog (No. 542) covers Cooper series of split roller bearings, giving specifications and detail drawings on wide range of dimensions and load capacities. Photographs show split roller bearings used in variety of industries. Cooper Split Roller Bearing Corp.

. . . For your copy circle No. 225

#### Overhead handling

How overhead handling is handled by crane and monorail equipment at Westinghouse's Kansas City jet engine plant is illustrated and explained in a new folder. Materials handling ideas of wide application are given and use of the Whiting equipment is shown. Whiting Corp. M-29

. . . For your copy circle No. 226

#### Tape coating

Where to use Tapecoat protective tape is the content of this bulletin. Some of the suggested fields of application: water and sewage service, transportation and communications, industrial piping of all kinds. Details of Tapecoat's construction and its ease of application are covered. Tapecoat

. . . For your copy circle No. 227

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#### Signode Seal

Summer 1955 issue of Signode house organ, carrying articles on export packaging, use of power strapping equipment, and packing gas and electric water heaters in a Midwestern plant, is available to interested persons from Signode Steel Strapping Co.

. . . For your copy circle No. 228

## WESTERNERS AT WORK

#### **CALIFORNIA**

Aircraft Standards, Inc.

Herman Plone is advanced to post of chief engineer of this Santa Monica manufacturer. Since 1951 he has served as shop superintendent and chief tool engineer. Edward J. Duggan is named to post of general manager. For past four years he has been supervisor of tooling production and on service sales and engineering staff of Hardman Tool and Engineering Co.

American Potash and Chemical Corp.

Roy MacLean, manufacturing process engineer at company's main plant at Trona, is appointed general foreman in charge of production at affiliated American Lithium Chemicals, Inc., plant in San Antonio, Tex.

United States Steel Corp.



Charles W. Lee G. A. Jedenoff U. S. Steel Corp.

Charles W. Lee is named president of Consolidated Western Steel Division, ad-vancing from his former position of vice president and general manager. He succeeds Alden G. Roach, who will devote full time to position of president, Columbia-Geneva Steel Division. Mr. Lee has been with Consolidated Western since its begin-

George A. Jedenoff is appointed superintendent of cold reduction department at Columbia-Geneva's Pittsburgh works. He fills position left vacant by Donald W. Lasell, who has been appointed assistant general superintendent of U. S. Steel's Fairfield tin mill in Alabama.

James C. Roberts is appointed contracting manager in charge of San Francisco district office of American Bridge Division, succeeding J. R. Fox, retired. In past five years he has served as contracting manager for New York and Denver districts.

Owens-Illinois Glass Co.

E. R. Owens, manager of Oakland plant, is named general factories manager for Pacific Coast division of this company, with Oakland by Earle Ingels, former manager of company's Clarion, Pa., plant. Wally Funke, chief engineer for Pacific Coast division, is placed in charge of construction of new plant near Portland, Ore., and will fill post of plant manager upon its completion next

Westinghouse Electric Corp.

Fenton L. Tippett is named manager of manufacturing operations at Sunnyvale plant, advancing from post of superintendent of quality control and test department. Richard A. Gieseker becomes manager of manufacturing controls. He most recently held post of assistant plant manager. Richard N. Parkin, manager of Naval Ordnance Project at plant, succeeds Mr. Tippett as superintendent of quality control.

A. H. Flath becomes regional operations manager for Pacific Coast region of Westinghouse lamp division, with headquarters in Emeryville. He has been administrative as-

sistant to regional manager.

Bethlehem Pacific Coast Steel Corp.

Hubert C. Swett, assistant general superintendent at Los Angeles steel plant since 1949, is named chief metallurgical engineer for this company, with offices in San Fran-



Hubert C. Swett Bethlehem Pacific Coast Steel Corp.



M. A. Ellsworth Fluor Corp., Ltd.

Fluor Corp., Ltd.

M. A. Ellsworth becomes vice president and general manager of newly formed engineering and construction division of this Los Angeles corporation. J. P. Wiseman is named to head products company which will be organized as a new subsidiary. He has been president of Fluor Corp. of Canada, Ltd., since 1952.

Consolidated Engineering Corp.

Arthur L. Schleppy is named director of company's newly created materiel department, which consolidates activities of production planning, materials control, shipping, and receiving. Mr. Schleppy, the former director of production planning and materials control, will be assisted by James C. Rowan, who was formerly manager of production control for Goodyear aircraft

Truesdail Laboratories

Philip J. Charley joins engineering staff of this Los Angeles experimental laboratory. He was formerly project engineer with Standard Oil Co. of California, El Segundo.

Chrysler Corp.

Allan Limburg and Ralph H. Montgomery are appointed chiefs of plant protection for Chrysler's plant in California. Mr. Limburg is assigned to the San Leandro plant and Mr. Montgomery to Los Angeles.

Henry J. Kaiser Co.
Paul C. Meyer is appointed assistant to vice president and general manager of Kaiser Engineers division of this Oakland company. For past three years he has been vice president in charge of administration at Kaiser Metal Products plant in Bristol, Pa.

Packard-Bell Co.
Theodore G. Eddy is named manufacturing manager of technical products division for this Les Angeles company.

Tide Water Associated Oil Co.

Samuel H. Harrison is named manager of company's Western division marine department in San Francisco, succeeding Harold J. Wilson, deceased. Mr. Harrison has been with Tide Water's Western headquarters since 1930. William E. Kammerer is promoted to new position of supervisor of operations for Western marine department, and Harry C. Ruf continues as supervisor of engineering. Wallace W. Mitchell, former superintendent of San Joaquin Valley portion of company's pipeline system, advances to newly created position of general superintendent of Western Pipeline department in San Francisco. Duane W. Heeren is named chief engineer of pipeline department, moving up from post of assistant superintendent of San Joaquin Valley system. William S. Davidson, Jr., is new super-intendent of San Joaquin district, with headquarters at Coalinga. John R. Rock becomes assistant supervisor of employee relations in Western division, succeeding Claude E. Fountain, who is now manager Western division, succeeding of company's nationwide employee relations program.

New position of safety supervisor in Western division is filled by Samuel O. Bacon, who for 11 years has been safety engineer of company's Avon Flying A refinery.

## RA G. PERIN CO. Material Handling Equipment

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#### WESTERNERS AT WORK

North American Aviation, Inc.

H. R. Shaw is appointed senior assistant to the director of electro-mechanical engineering department at company's Downey plant. He has been with company since November 1951. W. H. Yahn becomes general manager of Fresno plant's modification center, succeeding John Fluck, who has resigned because of ill health. Mr. Yahn transfer free free Columbus Obie when he had fers from Columbus, Ohio, where he has been director of contract administration.

Loven Chemical Co.



Harry Millerburg Dr. R. B. Seymour Loven Chemical Co.

Dr. Raymond B. Seymour, former president of Atlas Mineral Products Co., is named president of this Newhall plastic materials manufacturer. He succeeds Harry Millerburg, who is now chairman of the board.

Sterling Electric Motors, Inc.

Edgar K. Johnston is appointed vice president of manufacturing for this Los Angeles firm, and John R. Eastman becomes chief engineer.

Olympic Plastics Co., Inc.

Otto Hansen joins this Los Angeles comany as chief engineer of fiberglass division. He has previously been associated with sev-eral Southern California aircraft companies in development of reinforced plastic parts. Shell Development Co.

S. A. Ballard is named associate director of research for company at Emeryville. He was formerly head of petroleum refining department, and now takes charge of market development, plastics and resins, and polymer and chemical application departments.

James E. Murrin is named head of analog computing service of this Santa Monica company, succeeding G. W. Anderson, who moves to post of manager of analog simulation development section.

#### IDAHO

North-West Timber Co.

M. J. Huetter, vice president and assistant general manager of this company at Gibbs, assumes post of general manager formerly held by L. V. Brown, president. Irvin Wentworth, vice president in charge of sales, is placed in charge of plant production as well.

Potlatch Forests, Inc.

Phil Reinmuth succeeds C, O, Graue as manager of Rutledge unit of this Lewiston company. Mr. Graue is retiring after forty years with Rutledge and Potlatch Forests. Mr. Reinmuth has served as a management assistant in the new products division.

#### NEVADA

Kennecett Copper Corp.

William Gibson is appointed industrial engineer for Nevada Mines division at Mc-Gill. He has been with Kennecott since July of this year, coming from Boeing Airplane Co, in Seattle, and succeeds M. J. O'Shaughnessy, now assistant general manager of Nevada Mines division.

**Atomic Energy Commission** 

Walter W. Stagg is named manager of South Albuquerque branch office of AEC's Santa Fe operations office. He replaces Nor-man H. MacKay, who is now technical assistant to director of ACF contract division in Albuquerque. Mr. Stagg was formerly manager of Amarillo branch office.

#### OREGON

Mater Engineering

Jean Mater is now actively associated with this forest products consultant firm and its affiliate, Mater Machine Works, both of Corvallis.

## AIR-POLLUTION JITTERS?

Get Better Smoke and Dust-Control with John BEAN INDUSTRIAL PUMPS

Utilizing high pressures (up to 10,000 P.S.I.) BEAN pumps, with special nozzles, form billions of microscopic air-scrubbers... wash particles of dust, carbon or paint overspray from heavilyladen factory discharges.

The full potential for rugged Bean pumps in this application has not been realized, but every hour of every day, BEAN dependability, efficiency and ease of maintenance meets and exceeds thousands of industrial requirements.

Let Bean engineers prescribe for your high pressure pumping needs.

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**Consolidated Freightways** 

Thomas J. Sloan is named assistant personnel manager for this Portland motor freight company.

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Anthony A. Pack Hyster Co.

Anthony A. Pack is appointed to fill newly created position of assistant to president on special staff assignments for this Portland manufacturer. He was formerly with Vickers Incorporated in Detroit. H. Noel Dimick retires after 16 years as engineer in charge of straddle truck design and production.

**Portland Regional Office** 

San Francisco Ordnance District
New officer in charge of Army Ordnance
office at Portland is Capt. Louis J. Daue,
who returns to the United States after three years of duty in Germany.

Iron Fireman Manufacturing Co.

Richard T. Walker is named manager of plant educational services for all Iron Firemen plants in United States. He advances from his post as personnel director of company's two Portland plants and will continue to make his headquarters in that city.

West Coast Lumbermen's Assoc.
Fred L. Mattson, Jr., is appointed to manage new fire insurance department of this Portland organization.

Crown Zellerbach Corp.

Crown Zellerbach Corp.

R. F. Ditewig, former Northwest traffic manager for this company, is named to position of traffic manager at Western Transportation Co., an affiliate. G. A. Abel succeeds him at Crown Zellerbach. J. F. Maney fills Mr. Abel's former post as traffic manager of Waterway Terminals Co., another affiliate.

#### UTAH

Utah Oil Refining Co.

Ashby J. Badger, former executive vice resident, is elected president of this Salt Lake City oil company. He succeeds E. S. Holt, who is retiring after 42 years service with the firm. P. L. Vander Jagt, general manager of marketing, becomes vice president in charge of marketing.

#### WASHINGTON

Spokane Gas and Fuel Co.

Nathan Gellert becomes president of this utility company, succeeding Frank A. Woodworth.

Atomic Energy Commission

James E. Travis, acting manager since
June, is promoted to post of manager of
Hanford operations office at Richland. He
succeeds David F. Shaw, now the AEC's assistant general manager for manufacturing.

#### ASSOCIATIONS ELECT

**Western Society of Gear Engineers** 

(new organization):
President, Richard H. Cass, Hughes Aircraft Co.; vice president, Ronald K. Brewer, AiResearch Corp.; secretary, Richard A. Duszynski, Douglas Aircraft Co.; treasurer, James B. Gudikunst, Hughes Aircraft Co.

Purchasing Agents' Assoc. of Los Angeles, Inc.,

Electronic Industries Group:
Chairman, Fred J. MacKenzie, assistant director of purchases, Consolidated Engineering Corp., Pasadena.

Purchasing Agents' Assoc. of

Northern California:
President, C. T. Hofmeister, Standard Oil
Co.; 1st vice president, Lewis G. Baker, University of California; 2d vice president, O. B. Sundberg, Hewlett-Packard Co.; secretary, C. A. Dalen, Castle and Cooke, Ltd.

National Clay Pipe Research Corp.: Vice president, Roderic Antrim, chief sales engineer, Pacific Clay Products Co., Los Angeles.

American Institute of Electrical Engineers (Portland section):

Chairman, Robert R. Bracchi; vice chairman, Albert E. Opdenweyer; secretary-treasurer, James G. Kirwan.



Just as Fisher's have chosen the finest ingredients to develop products of the highest quality, they have used the same care in selecting General Appraisal Company to furnish property valuations that are beyond question. Whatever your need for an appraisal may be, you will find that General Appraisal has been a recognized authority since 1902.



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Chalk up another one for Slippery Sam, the high-gloss, high-slip floor wax.

Some administrators still believe that all floor polishes have to be slippery. That's why their bosses are paying top insurance premiums and worrying about liability suits...besides spending too much money for floor maintenance.

#### You're safe when you have LEGGE to stand on

Legge Polishes give floors a lustrous finish with in-built Safety. Their co-efficients of friction go as high as 75% beyond U.L. requirements for slip-resistance. And the Safety lasts. Heavy traffic won't "walkit-off". Many buildings report reductions of 98% and more in slip-accidents.

Here's a big dollars-and-cents saving: Tests show Legge Polishes stay on the floor up to 8 times as long as ordinary polishes. That means the big job of stripping and repolishing is rarely necessary. One famous institution lopped \$19,000 off its annual upkeep budget with Legge maintenance.

No wonder more and more hospitals, schools, industrial and commercial buildings are turning to LEGO

We'll gladly demon-strate the effectiveness of Legge Polishes on your floors. No obligation. Clip the coupon today and see for yourself.

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## TRADE WINDS

New Western headquarters for Metal and Thermit



Metal and Thermit Corp. moves Western sales and warehouse headquarters to new building in El Segundo, Calif. New location provides warehousing facilities for all of the firm's products, which include welding materials, industrial chemicals, ceramic materials, and plating and coating materials.

#### Change of name

Electrical Facilities, Inc., Oakland, Calif., manufacturers of precision transformers, testing equipment, and rectifiers, changes its name to Knopp, Inc. The firm remains under the same management.

#### District Manager Helbert

L. Payne Helbert is new district manager in Los Angeles for American Monorail Co. He was formerly in company's Charlotte, N. C., offices as industrial sales representative.

#### Ross valves in Northwest

Hydraulic and Air Equipment Co., of Portland, Ore., and Seattle, Wash., is appointed sales and service representative for Ross Operating Valve Co., Detroit, Mich. Representatives will serve the Washington-Oregon territory.

#### Radiant ceiling distributors

Burgess-Manning Co., Chicago, Ill., appoints R. E. Leggette Co., Albuquerque, N. M., distributors of its line of three-way functional ceiling that heats or cools ra-

#### Transitier moves two



Robert L. Juttelstad John B. Terrill, Jr. Transitier Truck Co.

Robert L. Juttelstad is appointed assistant sales manager for Western division of Transitier Truck Co. He will maintain offices in the Portland, Ore., headquarters. John B. Terrill, Jr., is elected secretary of the firm.

### "NEW PUMP" PERFORMANCE

after years of service

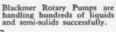


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#### Polk joins Hi-Tender

William C. Polk, former sales manager of the railroad division of the Clark Equipment Co., joins Hi-Tender Co., Leavenworth, Wash. as general sales manager. Company also amounces plans for national distribution of the two basic models of the Hi-Tender, combination personnel lift and mobile crane.

#### New LaSalle mill representative

Kenneth Bock is appointed full-time mill representative in Los Angeles-Southern California area by LaSalle Steel Co., Chicago, Ill. Fred Wissing, company's West Coast manager, continues his responsibilities in Northern California and Pacific Northwest areas.

#### Rockwell names Western manager

John P. MacCrossen is named regional manager of the Western region by Rockwell Manufacturing Co.'s Delta Power Tool division. Former San Francisco district sales manager, he replaces Byron E. Coon, who has been promoted to merchandising manager for the company at Pittsburgh, Pa., home offices. Mr. MacCrossen will have his office in Oakland, Calif.

#### Parkdale appoints Lynn

Harold Lynn is appointed general sales manager by the Parkdale Co., Los Angeles manufacturers of Beam butane-propane carburetion equipment. He will handle all national and foreign sales and the firm's distributors and dealers.



THE STATE OF THE S

Harold Lynn Parkdale Co.

James R. Boren Rust-Oleum Corp.

#### **Rust-Oleum representative**

James R. Boren, Western representative for Rust-Oleum, assumes additional duties of local representative for San Francisco area. Sales will be handled through firm's present distributors, Ralphs-Pugh Co., Republic Supply Co., and Pedley-Knowles and Co.

#### Warren and Bailey acquires firm

Spurgeon and Smith, San Francisco, is acquired by Warren and Bailey Co., Los Angeles industrial supply firm. Clifford Spurgeon is appointed general manager of the San Francisco area operation under the new ownership.

#### Prescott Co. consolidates

5

Formerly operating out of three Los Angeles locations, the Geo. M. Prescott Co. consolidates all operations, which involve the manufacture of platform trucks, skids, semi-live skids, warehouse trailers, dragline trucks, and special equipment, in one large plant in Alhambra, Calif.



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Headquarters for RIVETS and Rivet-setting Machines

Stocking for Stephens-Adamson

TRADE WINDS

Standard Products division of the Stephens-Adamson Manufacturing Co., Aurora, Ill., appoints four authorized Western stocking distributors of their line of belt conveyor idlers and return rollers, centrifugal loaders and pilers, car pullers, winches, and allied conveyor machinery. They are: The Harshberger Equipment Co., Portland, Ore.; Stephens-Adamson Manufacturing Co., Los Angeles; and S-A Products Co., San Fran-

Contract for new design firm

Pneu-Draulics Engineering Co., Pomona, Calif., recently established by Eric J. Saville and Raymond S. Hunt, Jr.., formerly serving with Consolidated Vultee Aircraft Corp., in Pomona, wins contract for design and development of airborne hydraulic and pneumatic equipment for Waterman Engineering Co., Evanston, Ill.

Flexonic appoints Bushnell

Bushnell Controls and Equipment Co., Los Angeles, is new exclusive sales representative for expansion joints manufactured by Flexonics Corp., Maywood, Ill. New representative will serve the Los Angeles area only.

Webster joins Canfield Co.

Lew Webster, former industrial engineer with Owens-Illinois Glass Co., joins M. E. Canfield Co., Los Angeles, distributors of materials handling equipment in Southern California area.



Lew Webster G. E. Sanko M. E. Canfield Co. A. R. Maas Chemical

Area Sales Manager Sanko

A. R. Maas Chemical Co., South Gate, Calif., names George E. Sanko Northern California district sales manager. He moves from the home office, where he has been working on special assignment, to the San Francisco Bay Area.

Quaker names Joyner

Quaker Pioneer Rubber Mills, a division of H. K. Porter Co., Inc., San Francisco, appoints James H. Joyner to position of manager, Pacific Coast sales. He is former manager of company's Los Angeles branch offices.

**New demonstration method** 

A. O. Smith Corp., Los Angeles, completes fleet of demonstration trailers for display of newest Smithway gasoline dispenser. Demonstrator model can be shown out of the trailer to display daylight use advantages or within the trailer to simulate night-time conditions.

Sales Manager McAlister

Leach Relay division of the Leach Corp., Los Angeles, appoints R. P. McAlister to position of sales manager. He will place particular emphasis on promotion of the development of new relay products, system packaging, and sale of the company's new line of light-weight, small pressure switches.

**Pioneer Rubber names Tracey** 

Joe E. Tracey is named Rocky Mountain representative for the Industrial Products division of Pioneer Rubber Co., manufacturers of industrial gloves, Former advertising manager of the Frontier Refining Co., Denver, he will remain in that city.





Joe E. Tracy Pioneer Rubber Co.

R. C. Herrmann Brooks Equipment and Mig. Co.

New Western factory man

Brooks Equipment & Manufacturing Co., Knoxville, Tenn., Borg-Warner subsidiary, appoints Robert C. Herrmann as Western factory representative with offices in Pasadena, Calif. He was formerly sales representative for C. Harold Sebenius Co., Pasadena.

Calspray names Hamilton

Leslie R. Hamilton is named coordinator of fertilizer operations for California Spray-Chemical Corp., Richmond, Calif. He will coordinate marketing activities in connection with production in company's new fertilizer plant now under construction in Richmond. He was formerly supervisor of fertilizer sales in company's Lindsay, Calif., branch

O & M appoints Davidson

Tom Davidson is new sales manager for O & M Machine Co., Inc., Los Angeles. Prior to joining O & M, he was vice president in charge of aircraft and missile divisions of Union Steel Co.

Handles guard rails in West

Paul T. Liefeld is appointed sales representative for Rheem-Beam guard rail by United States Spring and Bumper Co., the automotive division of Rheem Manufacturing Co. He will handle sales in the eleven Western states from Los Angeles offices.

Harnischfeger show

Honoring newly appointed distributor of its line of welding equipment, Absco Welding Supplies in Los Angeles, Harnischfeger Corp. holds show and dinner. The full line of welding apparatus, was displayed and demonstrated.

To sell boilers

Cleaver-Brooks Co. appoints Barrett and Yost Co., Seattle, Wash., to represent its line of boilers and equipment in parts of Washington and Idaho.

#### **Open San Francisco district**

Spang-Chalfant division of National Supply Co. opens district office in San Francisco, under the management of Edward A. Scanlon, to handle West Coast sales of Spang tubular products. Mr. Scanlon was formerly located in division's conduit sales department.

#### B. F. Goodrich change

Eugene R. Sumerix, former service supervisor for B. F. Goodrich Co. in Los Angeles, moves to new post in San Francisco offices as district representative. He will handle sale of aeronautical products and tires to vehicle manufacturers as well as tire sales to the government in the area of Northern California, Nevada, and Utah.

#### Braun on the road



Robert H. Braun Co., Los Angeles, disutors of Monarch solid rubber tires, commences operation of a mobile industrial tire press to save down-time on industrial trucks requiring solid tire changes. James White (photograph above) operates the truck in Los Angeles and Orange counties in California, changing tires on fork lift trucks, tractors, and other materials handling equipment.

#### New line for Maltby Co.

Edward D. Maltby Co., Inc., Los Angeles, distributors of power transmission equipment, adds New York Rubber Corp. line, which includes conveyor, elevator, and transmission belting. Complete stock will be maintained in Maywood, Calif., and Phoenix, Ariz., branch offices.

Firm also opens new branch office in Long Beach, Calif., with plans to build a warehouse on property acquired in that vicinity.

#### **Becomes Garrett subsidiary**

C. W. Marwedel, San Francisco, industrial supply house, becomes a subsidiary of the Garrett Corp., Los Angeles. E. F. Marwedel, former president of the firm, and Ralph V. Vincent, general manager, remain with the firm, while J. C. Garrett becomes president of the newly acquired company.

#### Bekins enters packaging field

Bekins Van and Storage Co. establishes new industrial packaging division in Los Angeles, under the management of Noble W. Jones. Services include design of scientifically engineered containers.

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## Completely new galvanizing line expands wire products range

The photograph shows the new galvanizing line, 365 ft long, which recently began operation at our modern Los Angeles wire mill. Incorporating many major improvements in galvanizing technique, the new line produces top-quality zinc-coated wire for such uses as A.C.S.R. core wire for reinforcement of electrical lines, fencing and merchant-trade wire. It handles as many as 40 strands of wire at one time, in sizes from 5/16 in. to 18 gage.

This is the latest major expansion in our wire mill which serves wire users throughout the West. We regularly produce other wire for a wide variety of uses—kitchen gadgets, chainlink fence, upholstery springs, cold-headed screws, and tirebead wire, to name just a few.

One of our standard grades may be just right for your product. Or you may need one of our special-purpose grades. In either case, we turn out a top-quality steel to give you the results you're looking for. We pay strict attention to surface characteristics, temper, uniformity of gage and the other details that count.

Let's talk over your wire needs. Quite often we can help our wire customers to turn a problem into a profit. Just phone our nearest sales office.

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## INDUSTRIAL HIGHLIGHTS

. . . read details under state headings

AiResearch begins \$400,000 expansion of Phoenix facility (p. 85)

\$37,000,000 paper mill development in British Columbia (p. 85)

United Airlines plans to order 25 jet transports (p. 85)

Kaiser to replace gypsum plant destroyed by fire (p. 85)

Construction underway on P-I-E \$1,500,000 Los Angeles terminal (p. 86)

\$2,500,000 gypsum plant underway in Colorado for Pabco (p. 89)

Ideal Cement to expand Boettcher, Colo., plant (p. 89)

Union Pacific plans 174-acre industrial area for Portland (p. 90)

\$6,000,000 ammonia plant for Phillips Pacific in Washington (p. 91)

#### ARIZONA

MORE SPACE FOR AIRESEARCH—AiResearch Manufacturing Co. of Arizona begins \$400,000 office and factory expansion at Phoenix main plant. Work will be completed by December. New \$5,000,000 test laboratory for AiResearch is opened at Sky Harbor Airport following 14 months' work.

GOODYEAR MOVE—All construction of airship envelopes will be moved to Litchfield Park plant of Goodyear Aircraft Corp., subsidiary of Goodyear Tire and Rubber Co. Up to now, one third of total production has come from Akron, Ohio, home plant.

CHANDLER PLANT—Construction of \$2,500,000 fertilizer plant for Southwestern Agrochemical Corp. at Chandler will begin in early fall, to be completed sometime in 1957. Plant will manufacture nitrogen and other ammonia fertilizer products, at output of about 25 tons per day. This is second fertilizer plant planned for Salt River Valley area—the other, a \$13,000,000 plant for Thunderbird Chemicals, Inc.

#### **BRITISH COLUMBIA**

PAPER MILL GROWS — \$37,000,000 development of MacMillin & Bloedel, Ltd., paper producing facilities is underway at Port Alberni, covering expansion of pulp mill and addition of kraft paper and newsprint mills.

#### CALIFORNIA

JET PASSENGER PLANES — United Air Lines will place contract for 25 jet airplanes before the end of this year, to be in service by 1960, according to statement of its president, W. A. Patterson.

REBUILDING — Kaiser Gypsum Co. plans a second gypsum products plant to be located at Pittsburg which will replace its Redwood City plant destroyed by fire in June. Plant will be adjacent to \$5,000,000 gypsum products plant due for completion in summer of 1956. Combined capacity of the two plants will be 274,000,000 sq. ft. of gypsum board products annually.

ONE DOWN, ONE TO GO—Minneapolis-Honeywell Regulator Co. begins production of gas appliance controls in new factory unit at Gardena, built at cost of over \$1,000,000. Total additional floor space is 105,000 sq. ft., in building located next to company's original plant. Honeywell has also started construction of new office and warehouse building in San Francisco.

RUBBER RESEARCH—Shell Chemical Corp. expands activities in synthetic rubber field by establishing a manufacturing research unit at Torrance. Studies will be conducted on synthetic rubber, its chemical components butadiene and styrene, and allied materials under direction of John Anderson, former research director in Shell facilities at Houston, Tex.

BUILD IN RICHMOND — Kingwell Bros., Ltd., San Francisco manufacturers of bronze bushings and bearings, are building new plant in Richmond, at cost of about \$200,000, and will move operations early next year.

BUY KIMBALL — Bristol Myers Co., New York, acquires Kimball Manufacturing Corp. of San Francisco, producer of molded, glass fiber reinforced plastics, which will continue in operation under present name as a wholly-owned subsidiary.

ALSYNITE EXPANDS — Work begins on new administration building for Alsynite Co. of America in San Diego, to be built at cost of \$40,000.

## The West On Its Way appears monthly in



industry in the nation's fastest growing region.

609 Mission Street San Francisco 5, Calif.



P-I-E BUILDS FREIGHT TERMINAL—Work will start this month on \$1,500,000 motor freight terminal in Los Angeles for Pacific Intermountain Express, which has its main offices in Oakland. Architects and engineers are Albert C. Martin and Assoc., Los Angeles, Facility will use 18 acres of 35-acre site recently purchased in central manufacturing district and will employ over 500 persons. Loading and unloading docks will accommodate 144 trailers at one time.

REA ADDS ROBEY—J. B. Rea Co., Santa Monica, acquires equipment, inventory, and personnel of Robey Rotor Co., Culver City, to be operated as Robey Rotor Division, producing gyroscopes, blowers, and miniature motors, as well as specialized equipment for use in Rea automatic control and data processing systems. A second subsidiary recently acquired is J. L. A. McLaughlin Corp. of La Jolla, which manufactures long-range communication equipment.

TWO BUILDINGS FOR TOPP—Topp Industries, Inc., completes remodeling of two buildings in Los Angeles which will house general offices, research and engineering departments, and manufacturing facilities for increased production of aircraft instruments, air-borne and ground support systems, electronic controls, and electro-mechanical equipment. Equipment valued at \$850,000 will be installed, to include a 10,000-ft. enclosure with atmospheric control for precision operations.

CONTRACT FOR CONVAIR — Multimillion dollar Air Force contract is awarded Convair Division of General Dynamics Corp., San Diego, for jet interceptors and combat proficiency trainers. Another contract for over \$8,000,000 covers ten cargo-personner type Model 340 Convair-Liners.

METALS RESEARCH AT MAR-QUARDT — Marquardt Aircraft Co., Van Nuys, undertakes high temperature research program in search of materials that can withstand service in range of 1,200 to 2,400 deg. F. Special laboratory facilities will include machines producing temperatures from 2,400 to 2,600 deg. Field of ceramic and cermet materials will receive special study.

SAWMILL BUY — Stockton Box Co., subsidiary of American Forest Products Corp., acquires mill and other assets of American River Pine Co., Foresthill, and Foresthill Logging Co.

BATTERIES—New automotive battery plant will be built in Los Angeles by Gould-National Batteries, Inc., of St. Paul, Minn., at total cost of about \$600,000, to be completed early in 1956. Scheduled output will be 2,000 batteries per day.

NEW DIVISION IN WEST — Guitan Mfg. Corp. of Metuchen, N. J., sets up new Engineered Magnetics Division in Culver City, for development and manufacture of magnetic amplifiers and magnetically regulated power supplies.

FUNDS FOR RESEARCH — Stanford Electronics Research Laboratory, at Stanford University, receives \$90,000 for building expansion from Gilfillan Bros., Inc., of Los Angeles and Hewlett-Packard Co. of Palo Alto, both electronics manufacturers. New laboratory facilities will be occupied by end of year.

BIGGER FURNITURE PLANT—Sierra Furniture moves into new \$600,000 plant in Los Angeles, which provides 35,000 sq. ft. of floor space, as well as receiving and shipping docks.

POSTPONEMENT — Pacific Gas and Electric Co. applies to Federal Power Commission for two-year extension of time for construction of Feather River plants. This would permit starting project as late as November 1, 1957, although company might decide to undertake construction sooner.

ADD NEW PRODUCT — Major Metal Products, Inc., Los Angeles, takes over manufacture and distribution of Warmahl line of floor furnaces, in agreement with Mahl Manufacturing Co., Los Angeles, which will continue its manufacture of other steel products.

MOVE TO GLENDALE—L. A. Water Softener Co., Inc., triples its manufacturing facilities with a move to new quarters in Glendale. Company manufactures water conditioning equipment.



NEW PLANT DOUBLES SPACE—Jordan Electronics, Inc., wholly-owned subsidiary of Panellit, Inc., of Skokie, Ill., moves into new building in Alhambra, which provides twice the space of company's former plant in Pasadena. Jordan manufactures equipment for radiation monitoring and is developing new industrial instruments which use radioactive sources.

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THE LIFE DUMPING UNITS

SNEDDON PROPOSED FOR HIKERS' MEMBERSHIP

MAMMOTH LAKES P.O. Aug. 14, (O.V.)

Up here in the High Sierras at White's Lodge there's lots of good fishing, good outdoor recreation. This must be about our fourth or fifth visit with Bill White, who



Bill White, who incidentally runs a fine resort here on the shores of Lake Mamie—one of the Mammoth Lakes chain—altitude 8,900 feet. They just stocked the lake again yesterday, so by this time tomorrow we are counting on a switch in diet from beans to trout.

Speaking of hiking, ran into a gang of hot footed enthusiasts of the John Muir Hikers' Association and was particularly reminded of our good friend, Richard Sneddon, well known humorist of bagpipe and Kilty fame, not to mention the Petroleum Club, authorship of "The Grapevine Column" and former editorship of several petroleum publications, but especially his knowledge of hiking and hiking societies.

In his native Scotland, we understand "Dick" was an ardent member of the Loch Lomond Hiking Society. It was while chatting with Membership Chairman of the J. M. H. A. that we put in a good word for Dick Sneddon. Certainly, his background of this popular outdoor sport from the land of bluebells and heather could add many innovations and hitherto unexplored activities, it was pointed out, such as dancing the Hichland Fling at the end of each day's hike.

Incidentally, as the fleecy white clouds drift by relentlessly, and our rowboat bobs up and down, there is absolutely nothing in this rugged country of minarettes, crystal crags and trout-filled waters to remind one of Lufkin Gears or Oilfield Pumping Units.



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. . . for more details, circle No. 76



NEW IN LOS ANGELES—New building for Cleveland Crane and Engineering Co. and General Conveyor, Inc., opens in central manufacturing district of Los Angeles. General Conveyor, with home office in San Francisco, is California distributor for Cleveland Tramrail division, Wickliffe, Ohio. Tramrail systems will be fabricated and assembled in new Los Angeles plant, which will also handle other type conveyor systems.

OLYMPIC PLASTICS—New and larger quarters are occupied by Olympic Plastics Co, of Los Angeles, which is planning expansion of its fiberglass operation.

MILLS SOLD — Feather River Pine Mills, Inc., of Oroville and Feather Falls, is purchased by Georgia-Pacific Plywood Co., Portland, Ore., for reported \$7,500,000. A subsidiary of purchased firm, National Wood Treating Corp., is sold by Georgia-Pacific to Koppers Co., Pittsburgh, Pa.

AERIAL CAMERAS — Gordon Enterprises of North Hollywood receives Navy contract amounting to \$373,000 for special aerial cameras.

BANNING MOVES—Banning Canning Co. moves from Banning to Beaumont, where modern plant is under construction which will provide almost twice size of former quarters.

PLANT OPENS—New Craveneer plant of Interstate Container Corp. in Red Bluff begins production, employing 50 men, with anticipated output of about 5,000,000 sq. ft. of container material per month.

BUY GRAYSON PLANT — William R. Whittaker Co., Ltd., manufacturer of aircraft valves, buys Lynwood plant formerly occupied by Grayson Controls. Whittaker moves from Vernon location.

EXPAND WESTERN ACTIVITIES—Thomas Industries, Louisville, Ky., plans new 50,000-sq. ft. plant in Los Angeles to house its West Coast subsidiaries: Moe-Light Co., manufacturers of lighting fixtures.

ONE MORE REACTOR—Atomic Energy Commission awards \$349,560 contract for design, construction, and test operation of research nuclear reactor at Livermore Research Laboratory, Livermore, to Foster Wheeler Corp., New York. The reactor, to be used by the University of California Radiation Laboratory for research programs, is scheduled to be in operation by December 1956.

TO MAKE GLASS—Joseph G. Leone forms Leone Glass and Manufacturing Co. in South Gate to produce all types of small glass items.

MOVES TO LA—Western Aluminum Rolling Mills, formerly of Seattle, Wash., moves its headquarters to Los Angeles. New 45,000-sq. ft. plant will house the sheet and coil aluminum rolling activity and the headquarters of five other operations.

FOR DELIVERY IN TENNESSEE—Consolidated Engineering Corp. receives contracts totaling \$573,000 for three electronic data-processing systems to be installed at Air Force's Arnold Engineering Development Center, Tullahoma, Tenn.



ALL FULLERS—Six direct descendants of founder of W. P. Fuller and Co., San Francisco, all of whom are active in company, are shown at board of directors meeting in Sacramento. (L. to r.) George W. Fuller, new member of board; Frank W. Fuller, Jr.; A. H. Brawner, president of company; W. P. Fuller III; Dana L. Fuller; and W. P. Fuller Brawner.

OPEN SAN DIEGO BRANCH — Win Ward Co., Pomona, sets up branch plant in San Diego for manufacture of truck bodies and sale of allied equipment.

CARRIER PROJECTS—Carrier Corp., which has its main offices in Syracuse, N. Y., adds new building at its Spectrol Electronics Division in San Gabriel, which will reportedly increase production of potentiometers by about 300%. Carrier has also taken an option on 68 acres of land in Puente, near Los Angeles, where it plans to build West Coast manufacturing plant. New status, Monrovia Aviation Division, is given operations at Monrovia, now working on subcontracts for components of North American Sabre Jet and Boeing Jet Tanker.

MAGNATRON — Magnatron Co. of America, Inc., New York, buys 20-acre plant site in Kearny Mesa from City of San Diego for construction of building to be used for electronics research and manufacturing, employing 150 to 200 persons at start.

HERCULES MOVE—Hercules Powder Co. will transfer manufacture of dynamite from its Contra Costa plant to new \$2,000,000 plant at Bacchus, Utah, upon its completion in summer or early fall, 1956. California plant will continue to produce nitrogen products for fertilizers, as well as other chemicals.

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REORGANIZE — Kaiser Aircraft and Electronics Corp., wholly-owned subsidiary of Willys Motors, Inc., takes over aircraft and electronics operations formerly carried by Willys. Transfer affects plants at Richmond, San Leandro, and Palo Alto, Calif., and Toledo, Ohio.

NUCLEAR POWER ADVANCE—Nuclear Power Group, Inc., new corporation sponsored by eight companies, which include in the West Pacific Gas and Electric Co. and Bechtel Corp., will participate in research and planning for first large-scale nuclear-electric power plant. Plant will be built in Illinois for Commonwealth Edison Co., which has contracted with General Electric Co. for its construction at a cost of \$45,000,000, of which Commonwealth will pay \$30,000,000 and Nuclear Power Group members \$15,000,000.

CEMENT PLANT EXPANSION—Construction is underway for expansion of W. F. Webster Cement Co.'s South Gate cement plant. Firm's home office is located in Cambridge, Mass.

#### COLORADO

PABCO BUILDS—Work starts on \$2,-500,000 gypsum wallboard plant at Florence for Pabco Products, Inc., of San Francisco. Plant is scheduled for completion next spring and will be supplied by gypsum deposits at Coaldale and Cotopaxi, near Florence.

CONSTRUCTION — Planned \$5,000,000 expansion of Ideal Cement Co.'s plant at Boettcher will be started this fall by Stearns-Roger Manufacturing Co., which holds engineering and construction contracts.

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WESTERN INDUSTRY 609 Mission Street San Francisco 5 CONTINENTAL EXPANDS — Continental Air Lines will build office, shops, and hangars at Stapleton Airfield in Denver to serve expanded traffic resulting from line extensions. Civil Aeronautics Board has approved link-up with Chicago and West Coast.

NO. 13—Trace Elements Corp., Grand Junction, contracts with Atomic Energy Commission to build uranium ore-processing plant at Maybell—the thirteenth mill planned for operation in the West.

URAVAN MILL TO GROW—United States Vanadium Co. signs amended contract with Atomic Energy Commission which provides for additional facilities to be built at Uravan mill by U. S. Vanadium.

CONVERSION — National Mines and Minerals, Inc., Denver, will establish fertilizer plant in building acquired from Denver Pie Co. in Canon City, using minerals mined in Fremont County and vicinity.

BEECH AT BOULDER—Beech Aircraft Co., Wichita, Kansas, will set up engineering activity near Boulder for research in military, commercial, and missile aircraft.

#### IDAHO

POTATO STARCH — Menan Starch Co., Idaho Falls, is building potato starch plant at Raugust, in the Columbia Basin.

#### NEVADA

NEW OPEN PIT—Nevada Mines Division of Kennecott Copper Corp. plans to begin mining at new Veteran open pit development in White Pine County in the near future. Work of removing overburden has been in progress for past two years, conducted by Isbell Construction Co.

#### **NEW MEXICO**

KAISER BUYS—Kaiser Steel Corp. acquires 202,950 acres of land and coal mining rights on another 326,854 acres from St. Louis, Rocky Mountain and Pacific Coal Co., Raton, for purchase price of \$3,500,000.

EXPAND POTASH OUTPUT—United States Potash Co. will spend about \$3,000,000 in expansion of mining output and refining facilities near Carlsbad, N. Mex.

SURVEY THE SOUTHWEST—Ramo-Wooldridge Corp. of Los Angeles is reported to be considering possible locations for proposed new plant manufacturing electronics systems. Cities under scrutiny are said to include Albuquerque, Denver, and Colorado Springs.

NEW INDUSTRY FOR GALLUP—Arimex Chemical Co., Inc., starts processing bentonite clay in \$250,000 facility at Gallup, which will employ about 30 people. Product is a desiccant used for packaging metal parts. Clay supplies come from Sanders, Ariz.

#### **OREGON**

INDUSTRIAL AREA PLANNED — Union Pacific Railroad acquires 174acre site along its main line in Portland for development as an industrial area. Purchase price was \$330,000.

ANOTHER REFINERY?—Texas Co. is reported to be considering establishment of a refinery in the Pacific Northwest.

NEW FABRICATING FIRM — H-K Equipment Co. begins operations on Swan Island, in Portland, handling industrial valves and fabrication of large diameter plastic pipe.

MORE INDUSTRY AHEAD—California Bag and Metal Co. acquires option to buy Vaughn Street ball park for planned industrial development project. Company is already drawing up building plans for a manufacturer and a warehousing company which plan to set up operations in Portland.

LOW BIDDER—Willamette Iron and Steel Co. of Portland is working on contract from Matson Navigation Co. amounting to \$26,624,000, for conversion of two mariner-type hulls into passenger liners for Australia-South Pacific service.

PENDLETON MOVES MILLS—Pendleton Woolen Mills, now in downtown Portland, will move its clothing manufacturing operations to new plant to be built on 7½-acre site south of city. Present building will serve as warehouse and office.

GREEN VENEER PLANT—Evans Products Co., Coos Bay, is scheduled to open new green veneer plant this month at Gold Beach. Mill will have capacity of 3,500,000 sq. ft. of  $\frac{3}{8}$ -in. board on a 2-shift basis.

U. S. PLYWOOD TO BUILD—Green veneer plant will be built somewhere in southern Oregon by United States Plywood Corp., according to its president, S. W. Antoville.

PARTICLE BOARD PLANT—Brownsville Particle Board and Associated Products, Inc., new firm headed by Flovd Rapp, gets approval of Oregon Public Utilities Commission on sale of stock to finance construction of new manufacturing plant on 24-acre site west of Brownsville.

#### UTAH

GRAPEVINE BULLETIN—Boeing Airplane Co. of Seattle will locate new guided missile plant in Intermountain Area which will employ about 4,000 persons at start. High on list of possible sites, according to unconfirmed reports, are Salt Lake City and Denver. Another possible new plant for this general area is one to be built by Marquardt Aircraft Co. for manufacture of engine components for Boeing anti-aircraft missiles.

POTASH PROJECT—Delhi Oil Corp. reportedly is considering establishment of potash mining and processing operations near Moab. Company is affiliated with Murchison interests of Dallas, Tex.

MERCURY RECOVERY-Storrs International Chemical and Refining Co. is reportedly planning to build 100-ton mercury recovery plant in Salt Lake

MORE GYPSUM—U. S. Gypsum Co. is reported to be planning \$1,000,000 program for expansion of gypsum output at Sigurd.

#### WASHINGTON

PHILLIPS PACIFIC — Newly organized Phillips Pacific Chemical Co., owned jointly by Phillips Petroleum Co. and Pacific Northwest Pipeline Corp., will build ammonia manufacturing plant in southeastern Washington, using natural gas piped from San Juan Basin. Cost of plant, now on drawing boards, will be over \$6,000,000. Site has not been picked.

EXPAND AT EDMONDS-Union Oil Co. of Calif. will add two stills for manufacture of air blown asphalt at its Edmonds asphalt refinery. Estimated cost of construction and equipment is \$400,-000. Work will be completed early in 1956.

CAN MANUFACTURING-California Packing Corp. is building can manufac-turing plant in Toppenish, scheduled for completion by start of 1956 packing

TACOMA REFINERY - United States Oil and Refining Co. starts construction of its :10,000,000 refinery at Tacoma. Operating date is set for December 1,

STAUFFER BUILDING - Stauffer Chemical Co. starts work on construction of liquid aluminum sulfate plant at Tacoma, which will be finished in Octo-

PEROXIDE PLANT GROWS-Buffalo Electrochemical Co. has underway \$1,-000,000 expansion project at its Vancouver plant, which will increase capacity for electrosynthesis of hydrogen peroxide by 50%.

WEYERHAEUSER RESEARCH-Weyerhaeuser Timber Co. will enlarge its development center building at Longview before first of the year and install special research facilities, to permit speedup of development work on forest products.

URANIUM ORE STATION?-Atomic Energy Commission may build an ore buying station in Spokane area if enough uranium (about 3,000 tons per month for three years) is guaranteed by private mining interests.

#### WYOMING

NEW POWER SUPPLY-Pacific Power and Light Co. states it plans to build steam plant in Wyoming by 1958. No site has been picked.

PLANT AT NEWCASTLE - Natural Gas Products Co. starts construction of \$3,000,000 plant in Newcastle which will process natural gas now wasted from Clareton Field.

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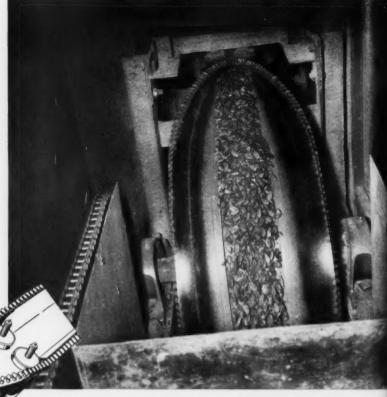
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A.N. STOLLWERCK INC. ZIPPER CONVEYOR ELEVATOR FOR HANDLING COCOA BEANS

Diagram of Zipper conveyor-elevator for handling cocoa beans at A. N. Stollwerck, Inc. System lifts beans 30 feet before beginning a 160-foot run over rooftens.

Zipper System
Ends Cocoa
Bean Breakage,
Bag Handling
and Dust



Zipper belt discharges over head pulley. Note how rubber teeth on sidewalls are designed to mesh like those on a conventional slide fastener.

A. N. Stollwerck, Inc. had a 3-way objective when it revamped its handling system. It wanted to eliminate breakage of cocoa beans — do away with manual handling of heavy bags — and get rid of dust. An S-A Zipper System met all three requirements — and required no major changes in plant set-up.

Providing the gentle conveying and elevating action called for, the completely dust-tight system went into operation in late 1950. Dust and lint from both beans and bags has ceased to be a problem. Beans are now moved with little or no breakage.

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The clean, dust-tight Zipper has reduced plant housekeeping time formerly needed to insure product purity. Reduced bean breakage has improved processing and bags no longer must be manually handled. Since the Zipper runs on the rooftop outside the plant valuable floor space is now devoted to productive use.

If advantages like these can help your operation, look into the S-A Zipper. A letter will bring you full facts—or a free survey that may show you some surprising economies over your present handling methods. No obligation, of course.



Return run of Zipper belt. Belt is open and flat, zips shut immediately past feed point.

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